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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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"The Chemical Age" Index

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Nitrogen Products

PERHAPS the most striking and in some ways most disquieting feature of the statistical supplement to the Nitrogen Products Committee's report, which is noticed at length in this issue, is the great increase in the production of fixed nitrogen and the fact that of the fifty plants at work not one is situate in this country, and only two are to be found within the Empire, Canada having one arc process plant with a maximum capacity of 800 metric tons a year and a cyanamide process plant estimated to be capable of 12,000 tons. Of the total estimated capacity for 1920 of 671,300 tons, the British Empire commands only 20,000. While Norway outdistances all rivals in the arc process, producing 30,000 tons out of a total of 38,300, Germany, taking the three processes together, occupies a predominant position over all other nations. Of the 325,000 tons credited to the cyanamide process, Germany commands 120,000, while under the synthetic ammonia process she has a capacity of 300,000 tons, and the only rival is the United States with the almost negligible figure of 8,000. The paramount position of Germany is indicated sufficiently by one statement: She can produce by fixation processes 424,000 metric tons of nitrogen a year, and the rest of the world can produce only 237,300 tons, of which this country produces none. Our one internal source of fixed nitrogen is, therefore, by-product works, and even there we produce only 100,000 tons, against Germany's 150,000. As a net result our internal resources represent 2,240 tons per million of population, while Germany's resources amount to 8,830 per million of her population. In the light of these figures our record looks extremely poor, and though the Report makes reference to important schemes at Billingham and elsewhere, these are still only in the construction or experimental stages and what may ultimately come of them is still uncertain.

Another interesting point established by the statistics is the progress of the cyanamide process, which some had thought was, in the words of the report, "becoming a thing of the past." In spite of recognised disadvantages, the statistics show a progressive increase in the amount of cyanamide manufactured throughout the war period. In France nine new works were erected, three of them by the Government, and others with substantial Government assistance. The United States Government also erected in the State of Alabama during 1918 the largest cyanamide factory in the world, with a capacity of about 200,000 tons of 20 per cent. cyanamide, or 40,000 tons of nitrogen annually.

Yet another point among the many brought out in the Report may be mentioned. Great as the increase in the potential output has been through the provision of large fixation plants, the total demand for fixed nitrogen is still growing at an even greater rate. In 1916 we applied 19,000 tons of nitrogen in the form of fertiliser to the soil of this country; in 1919 the amount had grown to 58,000. The consumption in 1919 was nearly two-and-a-half times as great as that in an average year before the war. Nor has the increase in the absorption of nitrogen been confined to this country. In Norway, though not an agricultural country, the consumption for fertiliser purposes of nitrate of lime rose from 5,500 tons in 1913 to 51,000 in 1918 and 110,000 in 1920. Estimates of the United States demand, again, indicate that there will probably be a doubling of the already very large total consumption in that country within the next seven years.

A good deal of attention is given in the Report to the position of the natural nitrate industry in Chile, but the information is not always official and the outlook remains a little uncertain. The price factor is, of course, important, but as regards actual production the fixation industry is now the largest contributor to the nitrogen requirements of the world.

Disposal of Industrial Wastes

It is not frequently that one meets in this country with cases where litigation has arisen or official action has been taken in connexion with the pollution of streams by industrial wastes. One or two memorable instances stand out, but in the main the chemical engineer is too alert nowadays to lay himself open to any possible claim for damages arising from the operations he conducts. In America, however, the matter appears to be dealt with in a more or less indifferent manner, the ordinary rights of riparian owners frequently being disregarded. Mr. C. A. Emerson who, as chief engineer of the Pennsylvania Department of Health, has made a particular study of stream pollution by industrial wastes has recently stated that even now many of the large Pennsylvanian streams are so polluted that to return them to a state of reasonable cleanliness is an immense task; but, before more stringent legislation can be introduced, economical and effective methods of treatment must be developed. Methods of treatment which have been attempted in the past have frequently been unsatisfactory, either because of the expense of the treatment process or because of misconception of the character and degree of treatment required. There was formerly a tendency to believe that most industrial wastes could be given treatment of the same general character, and that all processes should be carried to such a degree of refinement that the effluent discharged into the stream would be clear, colourless, tasteless and free from chemical and bacterial poisons. The judgment of to-day is upon a more rational basis, and takes into consideration the great variation in the physical and chemical composition of the different wastes requiring special treatment processes; the relative values of the industries to the nation; the present uses and probable future development of the water course, and the ability of the stream to absorb and purify the waste by natural agencies. Another forward step has been the realisation that many of our industrial wastes contain material of **value, and that improved methods of manufacture** which make fuller and better use of the raw materials not only lessen the cost of the commercial product of the industry, but reduce or even entirely remove a portion of the objectionable characteristics of the industrial waste, thus simplifying the methods and lowering the costs of treatment.

Mr. Emerson's remarks are particularly valuable in that he reviews those processes which are a major source of pollution, and discusses the efficiency of the means of treatment employed. For instance, tannery waste carries a great deal of matter in suspension; it may be alternately of acid or alkaline character, and owing to its avidity for oxygen and its active chemical constituents it will cause a nuisance when discharged into a small stream. Much of the hair from the hides, which was formerly wasted, is now being reclaimed by flotation combined with fine screening, and has a ready market. The waste from the lime vats is settled in properly designed and carefully operated sedimentation basins, and the sludge is either dried or recalcined and used as a fertiliser. After the removal of these various objectionable constituents the liquid waste remaining can be discharged into a sewer or large stream without causing nuisance, or if the receiving body of water is so small or its uses are such that further treatment is required, the liquids can be subjected to precipitation by chemicals, or the organic matter oxidized through violent agitation by compressed air and subsequently removed by sedimentation.

The wastes from the tar separators, ammonia, benzol and naphthalene stills of by-product coke ovens and the wastes from gas works employing the water-gas method of production, while not ordinarily polluting streams to a sufficient degree to cause objectionable conditions to those residing along the banks, are of particular importance because of the disagreeable taste which these wastes impart to the water when used for domestic purposes. The types of water filtration plants in general use by municipalities will not remove the disagreeable taste from a raw water contaminated by these wastes or by the products caused by the chemical combination of the active principles of the wastes. In fact, chlorine treatment of the water supply, which is in almost universal use as an adjunct to water filtration, apparently serves to accentuate rather than to diminish the objectionable taste. After application of chlorine, in the minute quantities ordinarily used in treatment of public water supplies, the taste has been noticeable in dilutions as great as one part of the wastes to ten million parts of water. Treatment of these wastes, to be effective, must, therefore, be most complete. Fortunately, such a method of disposal is now available and consists, simply, in excluding all such wastes from streams used as sources of public water supply.

Mr. Emerson's accusations and conclusions, although referring to conditions in America, might well be studied by chemical engineers in this country; for there can be no question that a much higher standard of cleanliness of operation is now demanded of industrial undertakings than was the case a decade ago.

Isolated Technology

The plea which Professor Smithells made in his recent address before the Congress of the Universities of the Empire at Oxford for the closer association of technology with education in the larger sense is well worth consideration. While recognising the enforced march of our own technology in the recent war of chemists and engineers, and the level to which the study of technology was carried in Germany, he raises his voice, not to preach the urgency of technology, but against its unbridled pursuit, and directs attention to the restraints under which it should be fostered. Whatever may have been the ultimate source of German decadence, it has proceeded, as he points out, step by step with changes of outlook, of aim, and of organisation in education from the ideals of old Germany. The reproach was not in their becoming a race of technologists, but in their education yielding up ideals to the worship of power and material efficiency. And so Professor Smithells warns us against a technology isolated and divorced from culture in the larger sense, and pleads for "the embodiment of technology in full and fruitful fellowship and interplay with accepted liberal studies."

It is a warning which needs to be remembered if we are to avoid a purely material and utilitarian conception of training. It has long been an axiom that technical training goes but a short way unless it is preceded or accompanied by a liberal general culture, and the best technology will always lack the wings for a high flight if it is nothing more than technology. That is always one of the dangers of too early or too complete specialisation, and, fortunately, it is perceived. The school is not the place to teach boys trades, though lovers of cheap labour would like to obtain ready-made miniature journeymen instead of merely well-educated boys; nor, again, is the laboratory the place to teach works practice, though some employers might like it so for the sake of cheapness. Technology is, in short, not a substitute for education, but a part of it, and it is good to find voices like Professor Smithell's raised against the division of educational work and life into watertight compartments, and in support of the older educational ideals represented by the "humanities."

Photographic Study of Colloids

THE Eastman Kodak Company has recently introduced a new instrument known as a "dispersimeter" for the study of colloidal suspensions or any finely-divided systems. The principle employed is that of intensity matching, the standard and test solutions being interposed in two beams of light and compared as to colour, light-scattering power, and clarity. The method of operation of the dispersimeter may be illustrated by considering an etched steel surface of which it is desired to estimate the relative areas of the etched to unetched constituents. An image of this steel etching is observed alongside of an image of some standard dispersity, such as a half-tone screen. In this screen the ratio of black to white space is accurately known. The image of the standard screen is then enlarged until its pattern matches that of the steel. By dividing the enlargement of the steel image by the magnification of the standard screen or pattern the dispersity is accurately specified.

In another form of instrument one beam of light is passed through the sample to be tested, while the other —after passing through an arrangement which controls its intensity—is brought into contiguity with the first beam by means of a photographic cube, and an intensity match is made in this way. This form, it is claimed, is particularly adapted to the measurement of turbidity or clarity of solutions.

Key Industries

THROUGH Lord Crewe's motion this week in the House of Lords, which would practically have shelved the Safeguarding of Industries Bill, was rejected, there are persistent rumours that the Government are not enthusiastic about the measure. This view is certainly supported by the luke-warm advocacy of it by responsible Ministers. Nothing approaching a serious defence of it on economic grounds has been attempted; its advocates seem content to throw upon Mr. Asquith the responsibility of having made promises which his successors must fulfil, and to rely on general excuses that something must be done to stop unemployment.

It is becoming more and more doubtful, however, whether the Bill is a remedy against unemployment or a guarantee of safety to the threatened industries. The Dyestuffs Act has certainly so far not brought prosperity to the dyestuffs industry, and even manufacturers are far less confident than they were as to the effect of the larger measure now under discussion. What is clear is that such measures bring with them increased price to the consumer, and an increasing measure of Government control and power of interference, and commercial opinion is becoming more and more hostile to this tendency. Of course, the Tariff Reformer will as heartily support the Key Industries Bill as the Free Trader will oppose it; but between the two there is a large volume of opinion not finally committed to either position, and it is the growing suspicion of this middle party which is causing supporters of the Bill considerable anxiety. We can discover very little trace of any real enthusiasm for it on the part of the Government as a whole, but not much enthusiasm is really needed to work the automatic majority at their disposal. The most serious threat to the Bill comes from the increasing doubts in the industries themselves as to whether the measure will ever achieve the results originally expected from it.

Annual Meeting in Canada

FOR the Annual Meeting of the Society of Chemical Industry at Montreal on August 29-31, we understand that, apart from lady visitors, the total number of members who have booked passages is a little over twenty. In addition to Sir William Pope (president), Dr. Longstaff (secretary), and Mr. E. V. Evans (treasurer), the party will include Mr. E. A. Alliott, Manlove, Alliott & Co.; Mr. F. W. Atack, Editor of *The Chemist's Year-Book*; Mr. C. S. Garland, a vice-president of the Society and chairman of Lighting Trades, Ltd.; Captain C. J. Goodwin, hon. treasurer of the Chemical Industry Club and official delegate of the Chemical Engineering Group; Dr. L. A. Jordan, chemical engineer to the British Xylonite Company, Ltd.; Mr. R. H. Clayton, of the Manchester Oxide Co.; Mr. F. W. Gamble, of Allen & Hanbury, Ltd.; Mr. J. MacWilliam, Sheffield; and Mr. J. Reid, of the Caldercruix Paper Mills, Airdrie. No visitors, so far as we are aware, are announced from France, but possibly some, who are unable owing to business pressure to carry out the full programme, may decide, like Mr. Emile Mond, to sail at a later date. The British party have arranged to leave on August 12, and as the full programme for Canada and the United States extends from August 29 to September 18, they will not return until early in October.

The Calendar

Aug 6	North of England Institute of Mining and Mechanical Engineers: "The Carbonisation of Coal at Low Temperatures," by John Roberts.	Newcastle-on-Tyne.
13	Mining Institute of Scotland ...	Glasgow.
29	Society of Chemical Industry: Annual General Meeting. 11 a.m.	McGill University, Montreal, Canada.

Supplementary Report on Nitrogen Products

Progress of Synthetic Process Abroad

A statistical supplement to the Final Report of the Nitrogen Products Committee has been compiled by Dr. J. A. Harker, and is now issued by the Department of Scientific and Industrial Research (1s. net). The nitrogen problem, in its wider bearings, was fully dealt with in the original report; the present volume is restricted to the statistical aspect.

FOR certain countries, the report states, examination of the prospects indicates that although the potential output has been greatly increased by the provision of large fixation plants during the war period the total demand for fixed nitrogen is still growing at an even greater pace. The pre-war average, in long tons of nitrogen, of nitrogenous fertilisers applied to the soil and the United Kingdom was 24,000. In 1916 the figure was 19,000, in 1917 46,000, in 1918 47,000, and in 1919 58,000. Similar increases were apparently common in many countries, despite the considerable advances in prices which took place. In Norway, which is in no sense an agricultural country, the consumption for fertiliser purposes of nitrate of lime rose from 5,500 tons in 1913 to 51,000 in 1918 and 110,000 in 1920, although in this case some small proportion of the increased consumption during the war was due to the cutting-off of the supplies of nitrate of soda previously imported. Estimates of the U.S.A. demand indicate that there will probably be a doubling of the already very large total consumption of that country within the next seven years.

As regards the progress made, the actual output of fixed nitrogen for the year 1912 and the approximate maximum potential supply for the year 1920 are shown below :—

1917 an even greater discrepancy was shown. The export duty throughout the war period and up to the present day remains at the pre-war figure, 2s. 4d. per quintal, or £2 11s. 4d. per long ton, and is included in the Chile price f.o.b. By January, 1921, freight for Chile nitrate to the United Kingdom, which during the war period and subsequently had been over £10 per ton, had declined to £2 10s. to £3 5s. per ton, but the price of the product in England was still maintained at the high average of £22 14s. for January, 1921. There was a gradual and almost continuous rise in the market price per long ton of Chile nitrate in the United Kingdom from the lowest war price of £10 in 1914 to the highest figure of £27 in 1917 and 1918. After the armistice, when the large war stocks began to be liquidated, prices fell during 1919 but rose again substantially in 1920 to almost the highest war figure.

No figures are available of the amount of Chile nitrate, if any, which reached Germany during the war, but attention is drawn to the consumption in the U.S.A., whose importation during 1917 and 1918, after that country entered the war, reached about three-quarters of the pre-war requirements of the whole world and more than three-fold the British war demand. Tables are published which indicate the great

I.—WORLD'S RESOURCES IN NITROGEN PRODUCTION.

Source of supply.	1912. Output in long tons of product.	1912. Output in metric tons of nitrogen.	1912. Percentage of total output.	1920. Productive capacity. Long tons of product.	1920. Productive capacity. Metric tons of nitrogen.	1920. Percentage of total productive capacity.
Chile nitrate industry (assumed 95 per cent. product)	2,586,975	411,329	57·5	2,966,061*	471,000	30·2
By-product industry (sulphate assumed 24·5 per cent. ammonia)	1,229,773	272,007	38·0	2,015,440	413,000	26·6
Fixation industry :—						
(*a*) Cyanamide (assumed 18 per cent. N.)	126,538	22,435	3·1	1,777,000	325,000	20·9
(*b*) Nitrate of lime and arc process products (assumed 13 per cent. N.)	75,000	99,907	1·4	290,400	38,300	2·5
(*c*) Synthetic ammonia... ...	Nil	Nil.	Nil	1,503,000	308,000	19·8
Total of Fixation Industry ...	201,538	32,342	4·5	3,570,400	671,300	43·2
GRAND TOTAL	4,018,286	715,678	100·0	8,551,900	1,555,300	100·0

* The figure inserted here to represent maximum capacity of the Chile nitrate industry is the maximum war output in a single year, which was for 1917.

Even if some allowance be made for the fact that the 1912 figures represent actual production and not maximum capacity, it will be observed that the world's resources have doubled during the period in question; also that while the percentage of the whole output contributed by the Chile nitrate industry decreased to one-half, the proportion contributed by the fixation industry has increased from 4½ per cent. of the whole in 1912 to 43 per cent. in 1920, *i.e.*, an increase in percentage of tenfold. The actual increase in the installed plant capacity expressed in tons of nitrogen, is, however, still larger, the capacity in 1920 being over 20 times the production of 1912. The fixation industry is now the largest contributor to the nitrogen requirements of the world. It is worthy of note that in spite of the much talked-of large extensions in synthetic ammonia plants, new cyanamide plant has also been installed during the war period to such a capacity that the potential output of this process, which, according to some authorities, was becoming obsolete, is still larger than that of any fixation process.

The Chile Nitrate Industry

Regarding the price of Chile nitrate as still dominating that of fixed nitrogen generally, statistics from various sources are given which show the very great discrepancy which obtained between the prices "f.o.b. Chile" and "Ex ship, Liverpool." For the years 1916 and 1918 the Liverpool price was practically double that at the Chilean port, and for falling off in production in nitrate in Chile, and especially in its exportation, during the year 1919, and the large recovery which ensued in the trade during the first six months of 1920. This fall in output was partly due to labour difficulties in Chile and shortage of coal, as well as to the cessation of the war demand and liquidation of war stocks. Others show the great increase which took place in the importation of Chile nitrate into Great Britain during the war period, the total during 1918 reaching more than four times the average pre-war figure. Yet another gives an approximate allocation of Chile nitrate imports to fertiliser and munition purposes. The consumption for fertiliser fell off very rapidly after 1915, while the amount used for the manufacture of nitric acid showed an enormous increase. The large amount of imported Chile nitrate employed previous to 1916 as fertiliser was almost completely replaced for this purpose by by-product ammonium sulphate produced in the country.

The Saltpetre Industry

Previous to the war about two-thirds of the imports of saltpetre into the United Kingdom came from Germany, but this was more than replaced by the development of the Indian saltpetre industry, which in 1916 attained more than six times its pre-war dimensions. In 1919, however, the Indian supply had declined to only about one-third of its maximum. Assuming that the amounts entered under the heading "Value" may be taken as an index of the price of saltpetre, the average

value per ton increased during the war to more than double, and is maintained at substantially double the pre-war price :—

X.—Imports of Saltpetre into the United Kingdom.

	Long Tons.					
	1913.	1914.	1916.	1918.	1919.	1920.
From British Possessions ...	3,000	4,786	21,957	19,184	6,985	—
From Germany	7,499	4,394	6	nil	nil	—
From other Foreign Countries	1,395	1,292	nil	nil	nil	—
Total from Foreign Countries	8,894	5,686	6	nil	nil	—
Total Imports	11,894	10,472	21,963	19,184	6,985	9,248
Value	£240,966	£230,244	£807,739	£835,921	£276,906	£452,976
Average Value per Long Ton	£20·26	£21·99	£36·77	£43·57	£39·64	£48·98
Percentage of 1913 price ...	100	108·5	181·5	215·0	195·6	241·7

The Nitric Acid Industry

From information furnished during the war to the Explosives Supply Department, the pre-war production of nitric acid in this country was estimated as 15,000 tons per annum calculated as 100 per cent. acid. About half of this was 80°Tw., or about 65 per cent. acid. The main demands were for explosives and dyestuffs. The output during 1917 reached 237,000 tons calculated as 100 per cent. acid. The quantity used for purposes other than explosives remained fairly constant throughout the war period at about 12,000 tons of acid (2,700 tons of nitrogen) of which dye manufacture took rather more than half.

The By-product Industry

An attempt has been made to revise and bring up to date the tables in the N.P.C. Report relating to the by-product industry, but the information available is very incomplete and in many cases ambiguous. The figures in Table XII. do not include the synthetic ammonium sulphate manufactured in Germany. There is great uncertainty as to the figure in this table for 1918, a return from another source giving for the production of sulphate in that year a total nearly a million tons larger. This larger figure, however, probably includes an estimate for the output of the German synthetic plants.

XII.—World's Production of By-product Ammonium Sulphate.

(Compiled from figures furnished by the Sulphate of Ammonia Association, the Board of Trade, and other official sources.)

	Production of ammonium sulphate.		Average market price of ammonium sulphate F.O.B. U.K. Ports.	
Year.	Ammonium sulphate. Long tons.	Combined nitrogen on basis of 24½ per cent. NH_3. Metric tons.	Per Long ton* of product.	Per metric ton of combined nitrogen.
			£ s. d.	£
1910 ...	988,579 ...	202,560 ...	12 3 2 ...	60·4
1911 ...	1,079,364 ...	221,161 ...	13 15 3 ...	68·4
1912 ...	1,212,556 ...	248,453 ...	14 7 9 ...	71·5
1913 ...	1,381,827 ...	283,136 ...	13 7 8 ...	66·5
1914 ...	1,186,741 ...	243,163 ...	11 7 1 ...	55·4
1915 ...	1,173,091 ...	240,366 ...	14 8 1 ...	70·3
1916 ...	1,202,548 ...	246,402 ...	16 0 0 ...	78·1
1917 ...	979,436 ...	200,686 ...	Export 17 17 0 ...	87·1
			Home 15 18 0 ...	77·5
1918 ...	1,118,620 ...	229,205 ...	Export 23 2 11 ...	112·9
			Home 17 7 6 ...	84·8
1919 ...	1,466,000 ...	300,383 ...	Export 26 12 8 ...	130·0
			Home 20 6 6 ...	99·2

* This price refers for the years 1910-1913 to a product containing 24 per cent. NH_3; for 1914-1919, 24½ per cent.

Table XIII. shows the national production of ammonium sulphate from all sources. The figure given for Germany is, however, so low, as to render it practically certain that it represents fertilisers only, and does not include synthetic and by-product ammonia and ammonium sulphate, which were used for munition purposes. The figures given for the United Kingdom are the actual production of sulphate and not the total ammonia supplies calculated as sulphate. In 1917 and 1918 the total output of by-product ammonia, calculated as sulphate, is given as 465,981 and 439,496 metric tons respectively.

Statistics of the national consumption of by-product ammonium sulphate during the war period do not appear to be available, and those for 1919 are stated by the Sulphate of Ammonia Association to be only approximations. The world's consumption of by-product ammonium sulphate is shown to have been in 1919 1,568,200 metric tons. Germany heads the list with 508,000, the United States is second with 304,500 and the United Kingdom third with 264,000.

An elaborate table (XV.) gives a sulphate of ammonia balance sheet for the United Kingdom. With a view to giving a comprehensive survey of the war position, data have been added showing the approximate amount actually consumed by the fertiliser industry. The striking features of the table are the great decrease after 1916 in the amount of sulphate exported, and a corresponding very large increase in the amount employed as fertiliser. From 1916 onwards very large quantities of ammonia and of sulphate were used in the manufacture of ammonium nitrate. In 1915 to 1918 the quantities of ammonia (expressed as sulphate) employed for this purpose were 8,000, 50,000, 125,000 and 120,000 tons respectively.

The Synthetic Ammonia Industry

No very reliable statistics beyond those of Table 42 of N.P.C. report have been published as to the actual production of the German Synthetic ammonia plants during the war period, but in Table XXII. figures are inserted which it is believed are an approximation to the truth. The following table has been compiled from an independent source of information. It does not quite agree with the figures in Table XXII.

XVI.—The Synthetic Ammonia Process During the War Period.

Metric Tons of Ammonia per day.

	1914.	1918.	1920. (Estimated Maximum Capacity).
Oppau ...	25 ...	220 ...	250
Merseburg ...	Nil....	400 ...	800* (When complete).
Total ...	25 ...	620 ...	1,050

*Later information leads to the view that this figure for the capacity of the Merseburg works has not yet been attained, and that therefore the estimated maximum capacity for 1920 of the German synthetic ammonia works has not yet reached the figure of 1,050 tons here taken.

Assuming 95 per cent. continuous operation we have approximate maximum annual output, calculated as metric tons of sulphate :—

1914	1918	1920
35,000	850,000	1,500,000

XIII.—National Production of Ammonium Sulphate from all Sources (Including Synthetic Ammonium Sulphate).

	Metric tons.							
Country.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	
Germany	548,558 ...	488,625 ...	341,308 ...	341,270 ...	281,600 ...	262,700 ...	660,431	
United Kingdom	439,565 ...	432,835 ...	445,029 ...	432,836 ...	250,000 ...	262,140 ...	356,754*	
United States	176,900 ...	166,616 ...	226,834 ...	294,838 ...	335,701 ...	352,406 ...	383,763	
France	74,500 ...	— ...	42,000 ...	25,000 ...	34,000 ...	30,000 ...	45,000	
Holland and Belgium	53,600 ...	5,000 ...	5,000 ...	4,000 ...	— ...	— ...	—	
Japan	— ...	16,035 ...	31,824 ...	38,203 ...	57,915 ...	91,444 ...	—	
Spain	15,000 ...	16,000 ...	16,500 ...	18,000 ...	12,750 (9 months) ...	— ...	—	
Australia	— ...	5,741 ...	6,503 ...	7,214 ...	9,988 ...	12,000 ...	—	

* The total quantity of ammonium sulphate delivered for home consumption for the twelve months ending June 30, 1920, was 233,500 tons.

— Signifies data not available.

The Norwegian Fixation Industry

The striking feature of the statistics of the Norwegian nitrate of lime industry is the large increase in the home consumption for fertiliser purposes, the figure for the year 1918 indicating that a quantity almost ten times as large as the pre-war amount was being thus supplied. Nitrate of lime was exported to a considerable extent to England for manufacture of ammonium nitrate by double decomposition with ammonium sulphate, but toward the end of the war period this process began to be displaced by other methods, employing Chile nitrate instead of nitrate of lime. The price of nitrate of lime sold in England for fertiliser purposes in December, 1920, was £23 15s. per ton or £179·8 per metric ton of nitrogen.

In the later war years a commencement was made with the export of nitric acid as such. The falling off in the export of cyanamide manufactured in Norway is partially accounted for by the fact that it was employed at the Norwegian arc process factories at Notodden and Rjukan as a source of a portion of the ammonia used in the manufacture of ammonium nitrate.

The Cyanamide Industry

The following table shows that the prevailing impression that the fixation of nitrogen through the intermediary of cyanamide was becoming a thing of the past, owing to the competition of the more direct synthetic ammonia process, is not valid for the war period. In spite of the well-known inherent disadvantages of cyanamide and the difficulties in the application of large quantities of this substance in the fertiliser industry, the statistics show a progressive increase in the amount of cyanamide manufactured right through the war period. In France nine new works were erected, three of them by the Government, and others with substantial Government assistance. The U.S.A. Government also erected in the State of Alabama during 1918 the largest cyanamide factory in the world, with a capacity of about 200,000 tons of 20 per cent. cyanamide, or 40,000 tons of nitrogen annually.

XIX.—World's Production of Calcium Cyanamide.

Year.	Quantities in metric tons. Calcium Cyanamide.	Combined Nitrogen on basis of nitrogen content of 18%.
1912	126,538	22,777
1913	181,444	32,660
1914	222,397*	40,031
1915	345,133*	62,124
1916	485,396*	87,371
1917	668,202	120,276
1918	668,802	120,384
1919	Returns incomplete.	

* Largely composed of amounts returned as "capacity of production," the greater part of whch was used in war industries.

Table XX. shows the development of the cyanamide industry in the different countries of the world, the output of fixed nitrogen by this process reaching in 1917 and 1918 the large total of over 120,000 tons of nitrogen. The German cyanamide capacity is at least equal to, and probably exceeds, the total world output here given. Evidently, therefore, the cyanamide works of the world were even during the war period either only producing at a fraction of their capacity, or, more probably, the returns in this table do not include such cyanamide as was employed as a source of ammonia for the manufacture of munitions. The principal producers of calcium cyanamide are Germany, with 178,000 metric tons in 1918, France with 100,000 tons and Norway with 178,472.

The Ammonia Oxidation Industry

Prior to 1914 the oxidation of ammonia was regarded as a process which had not got much beyond the experimental stage, although several small plants on different systems had been erected in Germany, Belgium and elsewhere. But after the outbreak of war Germany's imperative need for nitric nitrogen, the external supplies of which were cut off, caused that country to instal plant to carry out this process on a very extensive scale. Plants were also erected in America, France, Italy and other countries, but complete statistics of production are not available. The data in Table XXI. relate to two of the largest plants in Germany and two in America:

Thus it will be seen that the total annual capacity of these four plants in nitric nitrogen produced is about 100,000 tons, or, as 100 per cent. nitric acid, 450,000 tons.

The following table shows in metric tons of nitrogen the production for a series of selected years. Although the aggregate power employed in the arc process now amounts to the large total of over 300,000 continuous kilowatts or 400,000 H.P. the aggregate of the nitrogen fixed by this process appears only trifling in comparison with that obtained through the cyanamide and synthetic ammonia methods, being roughly one-tenth of each of these.

XXIII.—World's Production of Fixed Nitrogen.

	Metric Tons of Nitrogen. 1909.	1913.	1917.	1920*
From natural sources:—				
Chile Nitrate.	300,000	400,000	400,000	500,000
By-product industry ...	240,000	353,000	400,000	400,000
Total	540,000	753,000	800,000	900,000
From fixation processes:—				
Arc and miscellaneous ...	3,000	18,000	30,000	38,300
Cyanamide	2,500	60,000	200,000	325,000
Synthetic ammonia	—	7,000	110,000	308,000
Total	5,500	85,000	340,000	671,300
Grand Total	545,500	838,000	1,140,000	1,561,300
Proportion of Total obtained by fixation processes	1%	10%	30%	43%

* The figures for 1920 are an estimate of the maximum capacity and not of actual production.

Tables XXIV. and XXV., along with Table I., give further statistics as to the world's sources of fixed nitrogen. For military purposes the figure shown in the last column of Table XXIV. has a significance as being an approximate measure of the degree of economic independence of each of the countries in question as regards its supply of fixed nitrogen.

XXI.—Some Typical Ammonia Oxidation Plants.

Plant.	Location.	Source of ammonia employed.	Catalyst employed.	Annual capacity.	Approximate production. Tons of product.	Tons of N.
(1)	Germany	Synthetic ammonium sulphate and gas liquor.	Activated iron oxide.	About 35,000 tons N.	About 80,000 tons nitrate of soda and 15,000 nitric acid (as 100 per cent.)	About 16,000.
(2)	Germany	Gas liquor, ammonia liquor from cyanamide and synthetic ammonia.	Platinum gauze without electric heating.	About 18,000 tons N.	About 60,000 tons nitric acid.	About 13,000.
(3)	U.S.A.	Ammonia from cyanamide.	Platinum gauze with electric heating.	110,000 tons of ammonium nitrate.	—	—
(4)	U.S.A.	Synthetic ammonia.	Platinum gauze with electric heating.	22,000 tons of ammonium nitrate.	—	—

XXIV.—National Internal Sources of Fixed Nitrogen.
(*Estimated Maximum Production in* 1920.)

Country.	Population.	From By-Product Sources.	Metric Tons of Nitrogen. From Fixation Plants. Arc.	Cyanamide.	Synthetic Ammonia.	Total.	Tons Nitrogen per Million Population.
Germany	65,000,000	150,000	4,000	120,000*	300,000	574,000	8,830
Norway and Sweden	8,000,000	—	30,000	28,000	—	58,000	7,250
United Kingdom	45,000,000	100,000	—	—	—	100,000	2,240
Canada	7,200,000	3,000	800	12,000	—	15,800	2,200
Switzerland	3,800,000	—	700	7,000	—	7,700	2,030
France	40,000,000	15,000	1,300	58,000	—	74,300	1,850
United States	103,500,000	105,000	300	40,000	8,000	153,300	1,480
Austria	51,000,000	10,000	—	22,000	—	32,000	630
Italy	35,000,000	3,000	1,200	18,000	—	22,200	630
Other Countries	—	27,000	—	20,000	—	47,000	—
Total	—	413,000	38,300	325,000	308,000	1,084,300	—

* *See* note to Table XXV.

XXV.—Nitrogen Fixation Plants of the World.
(*Estimated Maximum Production Capacity in* 1920.)

Metric Tons of Nitrogen.

Art Process.	No. Plants.	Capacity.	Cyanamide Process.	No. of Plants.	Capacity.	Synthetic Ammonia Process.	No. of Plants.	Capacity.
Germany	2	4,000	Germany	7	120,000*	Germany	2	300,000
France	2	1,300	Austria	2	22,000	U.S.A.	1	8,000
Norway and Sweden	3	30,000	France	9	58,000			
Italy	2	1,200	Norway and Sweden	3	28,000			308,000
Canada	1	800	Italy	5	18,000			
U.S.A.	1	300	Switzerland	3	7,000			
Switzerland	1	700	Canada	1	12,000			
			Japan	4	20,000			
		38,300	U.S.A.	1	40,000			
					325,000			

* This figure is stated by some authorities to be much too low. Certain sources of information give it as high as 200,000. Even on the basis of this lower estimate, the cyanamide process is still the largest contributor to the world's nitrogen supply by fixation methods.

Summary.

Process.	No of Plants.	Capacity.
Arc	12	38,300
Cyanamide	35	325,000
Synthetic ammonia	3	308,000
Total	50	671,300

Price of Nitrogen Fertilisers

An examination into the cost of nitrogen fertilisers in England and Germany leads to the conclusion that over the period 1919-1920 a very large increase took place both in the probable cost of production and selling prices of fixed nitrogen in Germany and that to home and not only to foreign consumers the 1920 prices were enormously larger than those ruling in the pre-war and early war periods.

The average price per ton of nitrogen as Chile nitrate in England during 1919 and the first half of 1920 was maintained at the almost prohibitive figure of about £140. On the basis of a rate of exchange of anything of the same order as at present prevailing (260 marks to the £ sterling, January 1921), this is much higher than the enhanced German home price. The corresponding British home price of nitrogen as ammonium sulphate, although lower than that of nitric nitrogen, was in the region of £100.

British Developments in Nitrogen Fixation

The synthetic ammonia factory at Billingham, designed to manufacture about 60,000 tons of ammonium nitrate annually for war purposes, was commenced by the Ministry of Munitions early in 1918, but at the time of the armistice was only very little advanced. It has since been taken over from the Government by Messrs. Brunner, Mond & Co., Ltd., and is being redesigned to manufacture peace products, chiefly fertilisers. The subsidiary company they have promoted, Synthetic Ammonia and Nitrates, Limited, which will have a capital of £5,000,000, is at present concentrating upon designs for an initial plant to produce 25 tons of ammonia per day, or about 6,000 to 7,000 tons of nitrogen annually. Their works is, however, being laid out so that this small nucleus installation may be quickly enlarged to 100 tons per day, and afterwards to a maximum capacity of 300 tons per day, or about 80,000 tons of nitrogen annually. The original Government site of 260 acres is being increased to about 1,000 acres in all, and two ship berths on the River Tees have been acquired. This increased accommodation has been found necessary in order to give ample room for the development of the whole scheme, which includes the manufacture of a number of by-products. There is also to be an oxidation plant of a capacity of 10,000 to 12,000 tons of nitric acid annually.

A British company, Cumberland Coal, Power and Chemicals, Limited, has also been formed to erect works in England to operate the Claude process for the manufacture of synthetic ammonia. Information to hand states that a full size commercial ammonia unit, working at a thousand atmospheres, is now running satisfactorily in France, producing at the rate of 5 tons of ammonia per day.

The British Cyanides Company are continuing at Birmingham their large scale experiments on fixation of nitrogen by the barium process, employing fuel-heated furnaces. Though these experiments have been partially successful, final conclusions as to the ultimate possibilities of the process have not yet been reached.

The works erected at Dagenham by the Nitrogen Products Company to manufacture ammonium nitrate during the war period from cyanamide by the Ostwald process are now closed.

It is reported that a factory is to be erected in Japan under Government supervision for the MANUFACTURE OF ALUMINIUM by a new process.

The Australian Minister of Customs announces that permission will be granted American dye exporters to ship AMERICAN DYES to Australia when there is conclusive evidence that similar dyestuffs of British manufacture are not obtainable.

Reviews

FUNDAMENTAL PRINCIPLES OF ORGANIC CHEMISTRY. By Charles Moureu. Translated by W. T. K. Braunholtz. G. Bell & Sons, Ltd. Pp. 399. 12s. 6d. net.

Professor Moureu's book on Organic Chemistry has already reached the sixth French Edition and there seems to be every reason to expect further editions both in French and in English.

Rather more than a third of the book consists of an examination of some general theories which apply to chemistry and especially to organic compounds; these are pleasantly written, easy to follow, and full of information. The accounts of atoms and the atomic theory, of stereochemistry and isomerism, and of chemical equilibrium are unusually good, but the whole of this description of the fundamental principles is logical, thoughtful and valuable. There is no padding, only enough words to enable the facts to be assimilated without undue effort. Most of the important theories and observations are associated with the name of the discoverer and the date, and the historical sequence of the service is constantly kept before the attention of the reader in this manner.

An account of the compounds of carbon in a volume small enough to be carried about in one hand is necessarily a compromise between the desire to introduce information and the necessity of excluding it. Each author arrives at his own condition of equilibrium, and Professor Moureu's compromise differs from most others. This is fortunate; the reader is constantly being surprised by a clear statement of some principle which he fully expected would be squeezed out by considerations of space. The account of any particular compound is usually meagre, and the scheme of the book necessarily involves this; it is not so much a description of a number of chemical compounds as an introduction to the forces and energies concerned in the building up of the carbon atoms, to the changes introduced by the introduction of various radicals, and to those underlying principles which give order and harmony to a mass of data. The translation seems to be well done, and there is an appropriate, though short, introduction by Sir William Pope which sets one's mind thinking in the proper key to enjoy the book.

M.

THE CHEMICAL TRADE YEAR-BOOK AND BUYERS' GUIDE, 1920. London: Bandon & Morris. Pp. 304. 12s. 6d. net.

Established in 1899, this directory, which incorporates the Chemical Trade Directory of Chemical Manufacturers, Merchants, Brokers, and Agents and Makers of Chemical Plant in Great Britain and Ireland, is already well known to the majority of our readers. The present edition has been carefully revised, and the lists of products and the names of firms dealing in them have been greatly extended. The various products are arranged alphabetically throughout the book, and in each case an alphabetical list of the suppliers for manufacturers of the product is appended.

CONDENSED DESCRIPTION OF THE MANUFACTURE OF BEET SUGAR. By Franz Murke, Ph.D., A.M. London: Chapman & Hall, Ltd. Pp. 175. 15s. net.

Although this little book was written about sixteen years ago, so slight have been the developments in the beet-sugar industry that the author has been able to bring the book up to date with very few alterations and additions. The first three chapters deal with the harvesting, storing, fluming, washing, weighting and cutting of beets. The diffusion process, diffusion juice, after purification evaporation, thick juice saturation and filtration, first fillmass and remelt sugars are next dealt with in a brief and concise manner.

One of the most important stations in a beet-sugar factory is the lime-kiln, and in Chapter XV. the author gives an interesting description of its operation. The significance of the chapter on the osmose process is now almost exclusively an historical one, and very few osmose installations are now in operation; but as the author points out, with the present price of sugar and molasses it is still possible to derive profit from them.

Chapter XIX. deals briefly with the centralisation of condensers and vacuum pumps, the centralisation of motive power, water consumption and the problem of the purification of sewer water. The last chapter contains a number of useful formulæ and tables of various calculations.

THE CHEMICAL EFFECTS OF ALPHA PARTICLES AND ELECTRONS. By Samuel C. Lind, Ph.D. New York: The Chemical Catalog Co., Inc. Pp. 182. $3.00 net.

This monograph is the second of a series of scientific and technological monographs which is being issued by the American Chemical Society, and marks a distinct departure in the policy of that society, inasmuch as it is a serious attempt to found an American Chemical literature without primary regard to commercial considerations.

The subject of radio-chemistry, like photo-chemistry, is still in the experimental stage, and must necessarily be approached from the empirical side without any expectation of an immediate arrival at final principles. Dr. Lind, therefore, has presented experimental results of the chemical effects of some forms of radiant energy other than light in the hope that the examination and comparison with the result of photo-chemical investigations may contribute to a somewhat more comprehensive view of the field of radio-chemistry as a whole. The author has presented his experimental material in such a way as to emphasise the relations between the chemical effects of the material and of the photo-chemical radiations, and the theoretical development has been carried as far as the available data permit at the present time. The field of photo-chemistry is only touched on in comparing the nature of the various radio-chemical effects, and in connexion with the Einstein photo-chemical equivalence law.

The book contains a number of tables and illustrations and indices of subjects and authors.

THE CASE-HARDENING OF STEEL. By Harry Brearley. Second Edition. London: Longmans, Green & Co. Pp. 207. 16s. net.

The first edition of this book appeared in 1914, but it has been for some years out of print. In the meantime new ideas about steel and its heat treatment have been advanced and some of these have been found to be quite fallacious. In questioning the value of some of these ideas the author writes clearly, although, perhaps, a trifle dogmatically; but where knowledge is mainly empirical it may be said that no man's word is law upon such a subject. Criticism which induces the case-hardener to re-adjust his view-point and test his beliefs is therefore all to the good.

The book was written mainly for the use of those actively engaged or interested in the commercial production of case-hardened objects, and for that reason the chapters are arranged so as to appeal at once to the workshop experience and observations of craftsmen. The author states that it was not found possible to separate the subject into practical and theoretical divisions, and in any case it is doubtful whether such distinction is desirable.

No fewer than 103 illustrations are included, among them being a large proportion of micro-photographs.

A FRENCH-ENGLISH DICTIONARY FOR CHEMISTS. By Austin M. Patterson, Ph.D. New York: J. Wiley & Sons, Inc. London: Chapman & Hall, Ltd. Pp. 384. 18s. net.

This work has been produced in response to a demand for a French companion to the author's "German-English Dictionary for Chemists," and it follows the plan of the earlier book, which has met with general favour. A really good dictionary, as the editor points out, is a growth, and though he recognises the incompleteness of the vocabulary of this one, he may be congratulated on having laid an excellent basis for the perfect dictionary ultimately in view. The dictionary proper is prefaced by a useful introduction on French grammar and idiom. Where words have both a technical and a general meaning, both are given, and words of the same spelling in the two languages are defined even when the meaning is exactly the same as in English. The dictionary, which is convenient in size, will be welcomed as a serviceable office, works, or even pocket volume.

A HARD RUBBER COVERED DYE-STICK is a new product of the United States Rubber Company. The stick consists of a strong wooden core around which a tough rubber compound is vulcanised. The smooth surface of the rubber is free from splinters, and the non-absorbent qualities of the rubber are such that all traces of dye can be removed by rinsing in clean water.

Synthetic Alcohols and Liquid Fuels

We give below some particulars of the manufacture of alcohols from elemental carbon by the new process of Mr. G. C. Calvert, of the Metropolitan Laboratories.

CARBON (coal, coke, charcoal, &c.) is converted into water-gas and mixed with other gases according to the product desired. These gases are passed through an apparatus, details of which cannot yet be published, and the alcohol collected in a receiver. In the case of methyl alcohol, a yield of 80 per cent. of the theoretical is obtained.

This alcohol at present is entirely derived from wood, and is controlled as to price largely by America and Canada, the price being about £70 a ton. As synthetic alcohol, it can be home produced and sold at a very low figure. Many valuable uses for methyl alcohol, now restricted owing to its high price, will be extended. The raw material (carbon) is not controlled by any trust, and is obtainable in any country.

Methyl (Wood) Alcohol as Fuel

Owing to its comparative rarity, methyl alcohol has never hitherto been used as fuel, though quite suitable as such. Previous to this invention, the only known way of making methyl alcohol was by the distillation of wood, and the yield being so small (only about 1½ per cent.) the price was high, and its use as fuel out of the question.

From 1 ton of wood, dry distilled, is obtained 37 per cent. of charcoal, for which there is little use, and only 1½ per cent. of alcohol. The Calvert process can use this 37 per cent. of charcoal, or any other cheap carbon or carbonisable material, such as coke dust, coal dusts, &c., to make alcohol via water gas.

Experiments conducted by certain parties have shown that, owing to the higher compression allowable with methyl alcohol, the efficiency is very little lower than ethyl alcohol for use in internal combustion engines. The crucial test of any fuel is its cost per thermal unit. Using the enormous quantities of wood waste, charcoal or carbonisable tropical matter occurring in U.S.A., Canada, Sweden, Egypt, &c., it is estimated that methyl fuel alcohol can be made by this process at £4 a ton, thus being easily the cheapest known light liquid fuel.

Owing to its non-potability, Excise restrictions will not be necessary as is the case with ethyl alcohol. In the home market, coke dust or coal dust can be used as the raw material.

The possibilities of the process are considered by experts to be very large. Ethyl (ordinary) alcohol has been made by this process, and it seems that we shall not have to go abroad to tropical countries to make alcohol for liquid fuels after all. As with all really valuable inventions, the process is exceedingly simple, a simplicity only arrived at after many years of research, and, in the opinion of those capable of judgment, is of immense industrial value.

Industrial Alcohol

This discovery means a complete change as regards the world's alcohol and liquid fuel production. Hitherto the world has been searched for cheap fermentable substances which could be used to make ethyl alcohol. None occur cheaply enough here, and where they do the places are generally remote from the large centres, and transport plus cost of manufacture does not enable the product to compete, excepting locally, with petrol, &c. Carbon in one form or another is, however, available the world over, and quite cheap dusts or wastes are suitable, since water-gas made from this is the one and only raw material required.

Thus, every country can produce cheap alcohol for itself at prices hitherto impossible. Apart from fuel uses, methyl alcohol has many valuable industrial uses not filled by ethyl alcohol at all. It is the sole base for formaldehyde making, enters into use for dyestuffs, making methylated spirit, &c.; this despite its hitherto high price from £75 to £130 a ton. At this price methyl alcohol was obviously too expensive to burn as fuel. At a few pounds per ton, however, besides being the cheapest light liquid fuel known, other products will be made on an enormous scale, since restriction has only been due to high price, which was unavoidable when the only source was wood, and the yield under 40 lbs. per ton of wood.

In England, certain forms of coal dust, coke dust, &c., which are quite unsuitable for burning or briquetting, and are therefore waste products, can be used for water-gas making for this process. Abroad, in addition, wood waste residues, &c., are available in huge quantities, such as from Canadian number and by-products of distillery plants, South Africa wattle tree, and many others.

Thus, the requirement set forth by Sir George Beilby of the Fuel Research Board, that alcohol will only be an industrial possibility when made from waste or by-products, is fulfilled.

Efficiency

The United States Bureau of Mines, who conducted tests on petrol and ethyl alcohol as fuels in an internal combustion engine, give the efficiency of alcohol as 40, against petrol as 28. The efficiency of methyl alcohol is not quite so high as ethyl alcohol; but on this basis, with increased compression allowable, and less air required, is higher than petrol, thus coming :—

Petrol	28
Methyl alcohol	35

in relative efficiencies.

The ratio of efficiency of methyl alcohol being as 5 to 4, even at the same price as petrol it would have advantages. But by this process methyl alcohol can be produced under favourable raw material conditions for about one-tenth of the present price of petrol.

Chemistry of Upper Silesian Coal

COAL from the Emma pit, Rybnik, was extracted with pyridin bases by Hoffmann and Damm (according to a paper read before the German Chemical Society), 500 kg. furnishing 15 kg. of cold extract, and 35 kg. of warm extract (below 100°C.). Lixiviation of the extracts with cold ether gave 11·5 kg. of ethereal extract representing 2·3 per cent. (referred to the coal) of an olive brown powder. Washing with acid yielded only a small quantity of basic substances, one base being solid and the other a thick, reddish brown liquid, with a sweet, aromatic odour, and presumably belonging to the quinoline series. The acid washing also produced a brown precipitate in which nitrogen was decidedly present. The residual clear ethereal extract from which acids and phenols were recovered by treatment with 5 per cent. caustic soda, the insoluble remainder being classed as neutral oil. This, which is being further investigated, distils over, to a large extent, in a high vacuum, without alteration, and furnishes Pictet's melene in a pure white state. The alkaline solution, on neutralisation with mineral acids, gives organic acids which are readily soluble in sodium bicarbonate, immediately reduce permanganate solution (rendered alkaline with soda) and smelling strongly (as to one of them) of acrylic acid. At least three different phenols, one of them containing 9·5 per cent. sulphur in combination, are also recoverable from the alkaline solution. It is considered certain that all these substances are present in the coal and are not the result of decomposition or artificial synthesis. Owing to the comparatively large molecules (400-500 m.w.) they are difficult to define chemically, but identification is regarded as possible.

New Benzine Process

IT is reported by the *Deutsche Bergwerks Zeitung* that the Synthetische Benzinwerke G.m.b.H. is proposing to utilise a new process for the production of benzine. Dr. Erwin Blummer's process, which so far has been tried at a Karlsruhe testing works, is now to be experimented with in practice at Wilmersdorf. The process is said to differ from other processes in that the production of benzine takes place under considerably less pressure and without the necessity of stirring. The plant is to be erected in a former Bavarian powder factory near Munich, which is to be rented for 15 years, with the right of purchase, and which, owing to its isolated position and the number of boilers, &c., is very suitable for the purpose. Brown coal tar from generators and from productive works in Central Germany is proposed as raw material.

The Times reports that sugar factory owners in Pernambuco are making arrangements to use ALCOHOL FROM MOLASSES as a fuel and require machinery for the purpose.

Alkali Works Report—(II.)

The first portion of the Report was dealt with last week; the concluding portion given below relates mainly to works manufacturing sulphate of ammonia, chlorine, arsenic, etc.

Chlorine Works

THE increasing introduction of electrolytic chlorine methods has brought difficulties with it. The production of liquid chlorine in this country is of quite recent introduction, and though troublesome details have been encountered, resulting in some escape of gas occasionally during manufacture, the development of the manufacture has been, on the whole, on satisfactory lines. No trouble has shown itself in connexion with the storage of liquid chlorine or with its use. The manufacture of chlorinated compounds has come considerably to the fore in certain districts, where there has been development of the organic chemical industry; when chlorination is effected by chlorine, a strong gas is essential for the most satisfactory work, and this is obtained usually by gasification of liquid chlorine. Chlorination works may thus be erected in localities far removed from works manufacturing chlorine, since liquid chlorine is easily transportable in small cylinders or in tanks. In the production of some chlorinated organic compounds unpleasant volatile by-products are obtained, and leakages of small quantities of such are apt to give rise to unpleasant consequences. A complaint was received against such a work by reason of polished brass work on delicate instruments in a neighbouring factory becoming badly tarnished. The greatest care is necessary; not only should thorough scrubbing of exit gases from chlorination works be provided in order to absorb the hydrochloric acid, which is usually a product of the reaction but also to obviate any possibility of escape of traces of chlorine at any stage of the operation. These points have been receiving the attention of the inspectors, in whose districts such operations are carried on.

Tinplate Works.

Investigation of the tin plate-flux problem up to the year 1914 had brought about very considerable improvement in the atmospheric conditions in the neighbourhood of tinplate works, but something still remained to be done, and now Mr. H. J. Bailey has taken up the interrupted investigations, with the result that a still further improvement is to be chronicled.

At some of the works the adoption of wash-towers for the scruff-furnace gases is impracticable, owing to difficulties as regards draught, there being no possibility of connexion with the works main chimney or other hot chimney; usually at such works washing of the scruff has been effected prior to its being furnaced; unfortunately, this operation was not always carried out under the best conditions, and, moreover, it is a somewhat lengthy process.

The composition of the scruff taken from the tinning pots varies greatly in different works, and varies even from similar tinning pots in the same works, owing to differences in the methods of individual workmen in the cleaning of the tinning pots. Tin scruff has been tested containing as much as 20 per cent. of chloride of zinc, though generally from 8 to 12 per cent. is a more usual figure. Separation and washing of the so-called flux skimmings has helped considerably in reducing the quantity of chloride of zinc passing to the scruff-furnace for treatment, but it was found that, even where separation of such skimmings was practised, much chloride of zinc flux passed forward into the scruff taken from the palm oil side of the tinning pot and thus reached the scruff furnace.

Experiments were carried out at Mr. Bailey's suggestion at several works, with a view to discovering a simple method of separation of the major portion of the chloride of zinc from the tin scruff, and it was found that the scruff, when taken off the tinning pot and plunged, while hot, into a tank of cold water, disintegrated to some extent and the soluble chloride of zinc went into solution.

The disintegrated pieces of scruff, on being furnaced, gave much less fume than formerly, and the burnt dross, when taken out of the furnaces, was much less offensive.

A process for treating tin scruff has recently been patented by Mr. Clegg, of Cardiff, which will certainly prove efficacious, if it can be operated on a sufficiently large scale. According to this process the large masses of tin scruff are treated to a wet grinding, chloride of zinc is removed in solution, and so recovered; the disintegrated scruff freed from chloride of zinc is furnaced for recovery of tin.

Arsenic Works

There was a reduction of one in the number of works registered. The works have been fairly busy; condensation of acid gases and arrest of arsenical fumes has been good.

A valuable summary of the work that has been carried out in connexion with the arsenic works of South-West England has been provided by Dr. Fryer, who states that in the preparation of arsenious acid, as conducted in the works situated in Cornwall and Devon, mundic and other arsenical ores are roasted in a current of air; the sulphur and arsenic are thereby oxidised and driven off as sulphurous and arsenious acids. The greater part of the arsenious acid is collected in the flues and settling chambers provided for that purpose, the residual gases, containing uncondensed arsenious acid together with the sulphur acids and the gases of combustion from the furnaces, pass through condensers prior to their entry to the chimney. The flues and settling chambers are opened from time to time for the removal of the arsenical deposit—known as "arsenic soot." The "soot" is collected and re-sublimed in a refinery furnace where only coke or anthracite is burnt. In addition to these processes, at certain of the works, a vitreous refined product, known as "white arsenic glass," is manufactured by the sublimation of the refined product.

For many years prior to the date at which arsenic works were first brought under inspection by the Alkali Act of 1892, complaints were received respecting the escape of arsenical fumes from the chimneys attached to the calciners. A few of the works were well conducted and were provided with means for limiting the amount of arsenic escaping into the air by the use of flues and settling chambers or by the adoption of condensers, filters or washers, but at the majority of works operations were carelessly conducted, and in certain cases the residual gases discharged from the chimneys contained as much as 7 grains of arsenious acid (As_2O_3) per cubic foot. The fields and gardens surrounding such works were not infrequently rendered white with deposited arsenious acid as with hoar frost, cattle and herbage were fatally affected, and claims for compensation were many and serious.

The condition of affairs existing in 1892 was fully described by the then Chief Inspector, Mr. A. E. Fletcher. At that date the problem that faced the inspector was the urgent need of effecting an immediate and adequate condensation of arsenious acid, and the condensation of the sulphur acids was regarded as of secondary importance, save in quite exceptional cases where acidities were excessive owing to the special class of ore calcined. Moreover, arsenic works generally were situated in districts remote from populous centres. Farmers complained bitterly of the arsenical discharges, but were less critical of the sulphur acids, and to effect the satisfactory condensation of the latter by wash-towers and limestone towers would have necessitated the provision of a constant water supply (which could not in every case be ensured throughout the summer months) and the discharge of arsenical effluents into water courses with fishing amenities and accessible to cattle.

On the passage of the Alkali Act, 1892, the systematic collection and analysis of facts relating to the conduct of operations was commenced with a view to determining the conditions best suited for the condensation of the noxious and offensive gases. The first condensers to be erected consisted of towers packed with △-shaped bars and supplied with a good flow of water. The method was successful and the chimney escape, which at this work, on occasions, had reached a figure of 7·4 grains As_2O_3 per cubic foot, was reduced to less than a tenth of a grain per cubic foot.

Much valuable information respecting the relation of temperature of condenser to arsenic grainage escape was obtained by a study of the conditions of work at this plant, and the results appear to indicate the existence of a close relationship between the two sets of figures. Thus :—

	Grains per cubic ft.
Below 60°F. the escape of As_2O_3 averaged ...	0·05
At 70°–80°F. " " " " ...	0·10
At 100°–110°F. " " " " ...	0·30
At 140°–150°F. " " " " ...	0·45

At that date the use of what is known as the "Dry Filter" was favoured by the inspector for removal of arsenic fume from the residual gases leaving the settling chambers. Arsenious acid is not readily wetted, and apart from the loss of arsenic in the residual gases and in the effluent water, the use of wash-towers was held to be undesirable in many cases on account of the risk attending the discharge of contaminated liquors into water courses. Dry filters were accordingly provided at many of the works, and proved very efficient condensers of the arsenical fume. These filters were packed chambers varying in length from 5 ft. to 50 ft., and in depth from 16 ft. to 4 ft., with a width of 2 ft. 6 in. to 12 ft. The packing was placed on a suitable grid with a space below for detached solids. The fumes entered below and passed upwards through the filter under the action of the chimney draught. The "soot" is condensed principally on the bottom layers of the packing, and means were provided for the insertion of iron bars through holes in the side of the chamber to enable the material to be periodically shaken. If the filter became clogged and could no longer be cleared by means of the bars, the packing was removed and burnt in the calcining furnace, and the contained arsenic sublimed and received in the flues.

The chief objection to employing this form of condenser was the rapid disintegration of the material used as packing, and the trouble of re-charging. The acid gases rapidly destroyed brushwood (the first material used) and a more desirable material had to be sought for. Careful experiments were conducted at one of the works to determine the durability of various materials available for use, with the result that steel wire proved to be far superior to fibrous vegetable matter, such as willow, rope or cocoa-nut fibre.

In the early years of administration the arsenical ores calcined were in general low in sulphur, and the acidity of the exit gases did not call for special remark; but in 1897, with the continued depression in Cornish tin mining and the increasing demand for arsenic, there was a large increase in the amount of mundic calcined. Mundic is essentially an arsenical pyrites, and the amount of sulphur acids discharged into the air began to show considerable increase. The acid had a very prejudicial effect upon the life of the packing used in the dry filters, and the acidity of the chimney gases at many of the plants was such as to render it imperative to provide means for the condensation of the sulphur acids at works where hitherto the final discharge into the atmosphere had been relatively innocuous. Dry filters thus gradually fell into disuse, and were replaced by wash-towers and limestone scrubbers at works where the effluent waters could be disposed of without risk of polluting the water courses.

At a somewhat later date, and at certain works where the total acidity was high and the situation of the work such as to demand the greatest care in the conduct of operations to safeguard surrounding property from the ill-effects of undue escape of noxious and offensive gases, the limestone scrubbers were replaced by washers fed with milk of lime. The efficiency of the plant was thereby increased, but costs were unduly high.

Tar Works

These works have been very actively engaged. During the past few years considerable difficulty has been experienced in dealing with pitch, excessive stocks have perforce been retained at the works, and in some instances pitch bays have been inadequate; this has militated against the proper and efficient use of the pitch coolers. Of late, however, the pressure in this direction has been relieved, pitch stocks are being dealt with, and there is a return to approximately normal conditions.

Complaints have been received of late against a tar work situated in a thickly populated neighbourhood. Pitch fumes are very unpleasant, and particularly so if the pitch is run to the bays at too high a temperature.

Careful and extensive investigation has been made so far as the distillation of tar is concerned; suggestions have been made with a view to improving control and general conditions, and these suggestions are being acted upon. Beyond the distillation of tar, other operations are carried on here which do not come under the purview of the alkali inspector.

It is even yet necessary to call the special attention of tar distillers to the need for physical disconnection of stills, when these are being cleaned or are undergoing repair. Men should not be permitted to enter stills unless these have been disconnected.

The tar distilled and pitch produced in the United Kingdom in 1920 was as follows:—

	Tons.*
Tar distilled in—	
Gas and coke oven works	1,450,535
Other works	117,788
Pitch produced in—	
Gas and coke oven works	677,295
Other works	63,468

Zinc Works

There are 13 of these works, eight of which are in South Wales. During the early part of the year operations were continued on reduced output, but during the latter half of the year there has been a gradual closing down of works, with the result that at the present time operations are almost at a standstill. At one large works preparations have been practically completed for the manufacture of sulphuric acid from the gases produced by the calcination of blende, but temporary closure of the work has prevented the putting of the plant into operation.

Mr. E. J. P. Benn's Impressions of U.S.A

A New York Opinion

Chemical and Metallurgical Engineering (New York), in some notes on Mr. Ernest Benn's recent visit to the United States, says:—

"It is always refreshing to read the impressions of an intelligent and alert visitor who is familiar enough with conditions at home to enable him to make his comparisons and draw his conclusions rationally. If it so happens that he is of our trade or profession, the more interested are we in his observations on things in general, because we may assume that he sees them through eyes trained much like our own. Accordingly we looked forward with pleasure—and were not disappointed—to the impressions of Ernest J. P. Benn, of THE CHEMICAL AGE, London, who made a recent business tour of the United States. In a delightful address before the New York Business Publishers' Association Mr. Benn gave an intimate view of industrial conditions in England, and after he returned home he published in THE CHEMICAL AGE a very frank and illuminating statement of his impressions regarding ourselves. The fairness of his judgment in the latter case only serves to lend confidence in his appraisal of conditions at home.

"Observe the frankness with which he endeavours to convey his opinion that the trouble with England is that it is 'absolutely steeped up to the neck in socialism,' of innumerable brands, all having their roots in the broad conception that there is something wrong with private enterprise, private property, wealth and profit, and claiming that we must produce for use and not for profit. As a remedy for this distressful condition he sees the need of a crusade in England on behalf of a true understanding of that system of thrift, work and economy called capitalism, which offers opportunity for individual initiative. Contrasted with this condition in England, the American Socialist, in Mr. Benn's eyes, is of a pale, anæmic variety, quite incapable of qualifying for membership in the English Socialist party.

"But if Mr. Benn failed to find Socialism rampant in this country it did not affect his observation of that outstanding difference between industry in England and America—quantity production by mechanical means. He sees us devoted also to personal efficiency, which is largely responsible for the fact that we accomplish more per unit of time than do our English friends. He reaches the conclusion that even prohibition is accepted in principle as 'a weapon in international industrial competition.' In his mind it is 'the greatest force to be reckoned with in the world to-day.' Efficiency in industry and in personal matters is seen by Mr. Benn as a fetish of the American people.

"There is encouragement for American industry in these views on the part of one who has studied industrial conditions in England and observed them critically in the United States. When we are inclined to think that we have trouble with labour and production, we can find solace in Mr. Benn's conclusion that 'America is not heaven, but it is, as I see it, as near to an economic heaven as we mortals shall ever approach.'"

* One ton of tar taken to contain 190 gallons.

Accidents in Factories and Workshops

Notes on Dangers in Machinery and Processes

In the annual report of the Chief Inspector of Factories and Workshops, briefly noticed last week, frequent reference is made to accidents and the liability to accident in connexion with machinery and processes. The following notes are taken from the report.

Abrasive Wheels

THE great increase in the use of abrasive wheels is perhaps the most prominent feature of modern engineering practice. In this, and other industries, there is an almost endless list of articles in the production of which grinding is a factor. The provision of safeguards for persons employed at, or in proximity to, revolving abrasive wheels has thus become a matter of wide importance.

During the past year special attention has been given to the subject of bursts and all the firms making abrasive wheels have been visited and consulted. From what has been seen it must be conceded that the possibility of a defective wheel being despatched by the maker is slight. Damage in transit, or after receipt, is possible, but a *light* tapping before mounting should detect any crack, as a flawless wheel rings with a characteristic sound.

The contention, so often advanced by employers, that careful mounting and running of the wheels at fairly low speeds, obviates the necessity for a guard, entirely lacks force in the light of accident records. No abrasive wheel can be guaranteed safe even at 100 revolutions per minute—a hidden flaw, or undetected crack, is always a possibility; the most careful mounting will not prevent a wheel bursting in the not uncommon event of its being struck by a heavy article. The assertion that a guard cannot be used because of the nature of the work is usually an assertion only. In many shops it has been challenged, and very few jobs have been seen that would preclude the use of a properly adjusted or intelligently designed guard. In certain special cases it must be admitted that guards are impracticable; protection flanges should then be employed. The wheels used must be tapered on each side, and the flanges shaped to fit, of sufficient diameter to extend to within 2 in. of the outer edge of the wheel. Several sets of decreasing diameter are necessary to permit changing as the wheel wears. These flanges cannot be regarded as absolutely safe and do not afford protection from injury in the event of a piece of the wheel being broken off outside the flanges—a not uncommon accident where heavy castings suspended from lifting tackle are ground. They do *not* afford the same protection as a hooded guard and should be accepted only as a substitute where the nature of the work absolutely precludes the provision of a hood.

The subject of accidents from bursting, and the danger to health from dust, at abrasive wheels is at present under special investigation, and it is hoped to issue in due course a pamphlet fully embodying the principles and devices considered to be necessary and practicable for safety and health.

Burst Hydro-Extractors and Centrifuges

Five cases of bursting hydro-extractors were brought to the notice of the Department in 1920, which caused three fatal and six non-fatal accidents. The safeguards suggested may be briefly summarised as below:—

Design

The essential factors are—(i) Maximum safe working speed; (ii) Maximum safe load for such speed; (iii) Thickness, nature and quality of material in cage body. These should obviously be known to the user, and it would, therefore, be useful for each new machine sent out, to show them on a dated, maker's index plate; (iii) is particularly necessary in cases where the cages are lined to resist corrosion. The stress in a rotating thin cylinder varies as the square of the speed, the thickness not affecting the result. When loaded, the added stress cannot be calculated with anything like exactness, but the thickness in this case is a fundamental factor. The maximum speeds laid down by manufacturers for some old cages constructed of thin copper plate can be shown to be excessive. In any case copper is a somewhat unreliable material to use, and a very high "factor of safety" should be adopted. Users, particularly of old machines, should therefore take special care to satisfy themselves as to the appropriate safe speed under the given conditions. Steel has now largely superseded copper, but is not so resistant to certain kinds of corrosion.

Construction

Some of the latest machines of even up-to-date firms are not free from criticism as regards the all-important matter of cage construction, particularly as regards: (i) The quality of material; (ii) The adoption of welded joints. High production charges may induce manufacturers to relax their standards somewhat, but this would be a most mischievous and retrograde policy. The materials used should comply with a specified high standard of quality. Welded joints appear to be unsuitable in hydro cage construction, where the material is subjected to high and varying tensile stress. In one case, where the fracture followed the weld for part of its length, tests made at the National Physical Laboratory fully confirmed this view. The outer casing is best made of steel plate; cast-iron, used in old types, is unlikely to withstand the shock from a burst cage.

Installation

A strong concrete foundation is necessary to which the machine must be firmly secured. After any disturbance of the original machine bedding, and before starting again, the machine must be carefully reset and secured. One burst in 1920 resulted from neglect of this. The driving arrangements should ensure that the known safe speed cannot be exceeded. A steam engine, for instance, must be provided with good governing arrangements. When the hydro is the only machine in action, racing is to be feared unless the governor be in perfect order. Pulley sizes for belt-driven machines must be carefully checked, no approximations on the wrong side being admissible. An expert opinion should be obtained before purchase, the speed and load factors being specifically re-determined, with due regard to the condition of the machine. This matter admits of no carelessness.

Maintenance

The intervals at which these necessary examinations ought to be made should be determined by the particular use of the hydro. Hydros subject to corrosion, whether lined or not, need very frequent examinations of the most searching character. Examinations of insured machines by the officials of the Companies will generally be too infrequent to suffice. Firms should therefore arrange and enforce a system of periodic examinations to meet the conditions under which their machines are worked. Only intelligent and careful workers are suitable, who must receive definite instructions and be properly supervised. The machine must be run under conditions of balanced loading if additional local "shock" stress is to be avoided, and the continuous care of the attendant, both as regards the packing of the load and the gradual starting-up from rest, can alone avoid this danger. Lubrication demands most careful attention; the makers' arrangements for this should be thoroughly understood and properly maintained. Repairs of hydro-extractors should be placed in the hands of competent firms who are in a position to give the best advice concerning such plant. Even if still reasonably serviceable the safe speed should be re-determined after the repairs have been completed.

Explosions and their Causes

Petrol Naphtha

The year has been marked by several explosions in connexion with the transport and use of petrol, naphtha and substances containing these volatile and highly inflammable liquids. An explosion at an india-rubber factory caused the deaths of seven men and injury to nine others, and is thus described:

"In the department in which the accident occurred, cotton fabric impregnated with a solution of rubber in naphtha and rolled into bundles is taken to the naphtha recovery plant, where the excess of naphtha is removed, before being taken

to the steam heating frame. Owing to an oversight, a roll of solutioned fabric was conveyed directly to the warming frame from the spreading shop with the result that, when a certain amount of cloth had passed over the frame, a violent explosion took place. Chemical fire extinguishers and ceiling sprays were used and the fire was soon extinguished. Elaborate precautions are taken with regard to ventilation and the prevention of fire; the place is lighted electrically, safety globes being placed round the lights, and the machines are operated electrically. It is presumed that the explosion was caused by a spark from the calender motor or by a spark of static electricity generated by the passage of the cotton fabric over the steel frame of the warming machine and shows the necessity for taking all possible precautions to prevent sparking in an atmosphere charged with inflammable vapours."

Another explosion, involving the deaths of seven men and injuries to four others, occurred in connexion with the repair of an oil tank barge, and has been the subject of a special inquiry. This barge was used for the transport of petrol on the Thames, and in order to bring its tank into conformity with the new regulations of the Port of London Authority, certain alterations were necessary. The tank was steamed out for a period of three hours one evening in order to remove any residual petrol and the next morning the barge was taken to a repairing yard where the tank had to be lifted out. To facilitate the lifting, bolt holes had to be cut in the top of the tank, and for this purpose an oxy-acetylene burner was used. When the flame from the burner penetrated the metal of the tank top, a violent explosion occurred, which ripped the top off completely and projected in all directions all the men who were working thereon.

Mr. Dunolly (Southampton) describes another fatality due to the explosion of a petrol tank in a motor boat which was being repainted. A painter was applying a blow lamp to the outside of the hull and near the petrol tank. The latter had not been sufficiently ventilated to remove all the petrol vapour. In the same district a steel petrol drum exploded whilst being welded through the residual petrol not having been properly removed.

Repair Work on Tanks

These explosions again emphasise the necessity for the observance of special precautions in connexion with repair work upon tanks which have contained petroleum, petrol or similar liquids, whether such tanks are on barges, steamers, or elsewhere, including the following:—

(1) All tanks should be thoroughly steamed and adequately ventilated so as to ensure the complete removal of any oil or spirit vapour.

(2) After steaming and ventilating, the atmosphere of ship and barge tanks should be tested by an expert chemist, and no naked light or source of ignition should be brought near it until the chemist has certified it as free from inflammable vapour.

A fatality due to an explosion of naphtha or benzol vapour arising from a quick-drying paint named "Duropene," is described by Mr. J. H. Rogers (S.W. Division). About a dozen tins of this paint had been stored in a timekeeper's office. Finding the office fire did not burn readily, an attendant dipped a stick in the paint and then placed it in the fire. An explosion followed immediately, and the wooden building caught fire. Two men in the building managed to crawl to the door, but one was so badly burned that he died. The explosion was doubtless due to the ignition of the vapour from the paint accumulating in the small building. In the Warrington district a somewhat similar explosion of petroleum spirit used in an oil extraction process caused the death of one man, injury to another and the destruction of a building. Mr. Brothers, describing the case, considers it probable that the vapour, given off whilst running the petroleum spirit into a warm still, escaped through an unclosed valve to the open air and reached a naked light near the doorway of the building.

It cannot be too widely known that the vapours of benzine, petrol, naphtha and benzol (benzene), when mixed with air in the proportion of less than 5 per cent. form explosive mixtures. In order to avoid danger, it is therefore essential that naked lights or other sources of ignition should never be allowed in any places where any of these substances are used or stored.

Acetylene

During recent years there has been a considerable increase in the use of acetylene gas, mainly in connexion with oxy-acetylene welding and cutting processes. This increased use of the gas has, unfortunately, been accompanied by an increase in the number of accidents arising from explosions of mixtures of this gas with air or oxygen. In consequence of this, a special memorandum on "Dangers connected with the use of acetylene gas" was issued by the Factory Department, which contains a summary of precautions necessary for the safe use of this gas. One of the fatalities was caused by an operator using a naked light whilst making an adjustment during the re-charging of a generator. In another a worker, overhauling a generator, was so foolish or thoughtless as to strike a match to test for a leakage; in a third case, a workman disconnected a gas tank near a foundry cupola and a spark from the latter probably caused the explosion. One explosion was apparently caused by the spontaneous ignition of the gas when the gas bell was removed for cleaning. The ignition was probably due either to the presence of phosphoretted hydrogen as an impurity or to overheating of the calcium carbide.

Grinding Potassium Chlorate

A fatal explosion occurred in a mill grinding potassium chlorate. It is surmised that the material was packed between the upper and lower stones of the mill, thus throwing the upper one off its pivot. Perchlorate of potash also caused a fatal accident in a chemical works in the Swansea district, thus described by Mr. Hilditch:—

"The accident occurred in a building used for crystallising perchlorate which is subsequently ground and sieved. The latter process was carried on in a part of the room near an air compressor used for forcing air into a solution of perchlorate contained in open vats in an adjoining room. A few seconds before the explosion air was passing freely into the solution, when suddenly the compressor cylinder exploded. A piece of metal was projected and struck a man, fracturing his skull. The explosion was of a severe character, and was followed by ignition of the grease and oil on the machinery. Perchlorate of potash is a much more stable compound than the chlorate, and is not usually regarded as explosive, but it is a powerful oxidising agent, and experiments made after the explosion showed that this substance when mixed with organic matter, such as lubricating grease, would detonate when struck with a hammer. A layer of such a mixture was found on the face of the compressor piston and inside the cylinder cover. It is always advisable that the air supply for compressors should be drawn from a dust-free source, and that lubricating oil should be used as sparingly as possible in the cylinders. Had the first of these precautions been observed, perchlorate dust would not have been taken into the cylinder.

An explosion causing the deaths of two workmen occurred in a fire heated still for distilling nitro-benzol used as a basis for aniline dyes. The methods of manufacture adopted at the particular works were somewhat crude, and the explosion was apparently due to some dinitro-benzol (an explosive) being present in the nitro-benzol and coming into contact with an over-heated part of the metal of the still. The distillation of such substances as nitro-benzol should be carried out by steam heating, and all precautions taken to prevent the formation of the explosive dinitro compound during the nitration.

Nitro and Amido Derivatives of Benzene

These regulations have been well observed, and no cases of toxic jaundice arising from the manufacture of these derivatives have been reported. In one works the use of an induced draught overcame the difficulty which had been experienced in maintaining an efficient exhaust owing to the fan becoming corroded by the fumes.

It is proposed to embody these regulations in the new code of regulations for chemical works, a draft of which was issued on December 24, 1920; the code for nitro and amido derivatives of benzene will, therefore, be revoked as from the date when the new regulations come into force.

Vulcanising of Indiarubber

The new regulations for certain dangerous processes in the rubber industry, which have recently been issued to the trade in draft form, embody the provisions proposed in substitution for the present special rules. The chief matters, other than "cold-cure" vulcanising, with which the draft regulations are

concerned, are the use of lead compounds in mixing, and of benzol in spreading and other processes.

The unsuitability of a plenum system of direct air supply for rooms where dangerous or noxious fumes are given off was again emphasised during the year in reports received concerning a Midland rubber works. In this factory the plenum system, assisted by extraction fans, was installed for two rooms where fumes of carbon bisulphite and naphtha were evolved in the course of manufacture of small goods from rubber solution. The incoming high-velocity air currents from the plenum system caused dense pockets of fume, which persisted more or less in certain parts, notwithstanding the action of the extraction fans. That the plenum system was the cause of the trouble was amply demonstrated, for when it was throttled down so that the air only entered very slowly, as in natural supply, the fume pockets disappeared. The new regulations propose to limit the velocity of air supply from a plenum system for rooms in which fume processes are carried on to 350 ft. per minute.

Several firms have in recent years arranged the mechanical details of their "cold-cure" vulcanising machines for waterproof cloth so that the feeding-in and batching-up rollers are outside the enclosure, which is provided around the machine to confine the carbon bisulphite fumes. The workers can give practically all the necessary attention from outside the enclosure which they enter but rarely. The rollers in question are usually at the two ends. In one case, where the rollers are carried in the middle, a similar satisfactory result has been secured by providing two enclosures, separated by a narrow gangway between, to give the necessary access to the rollers. In this arrangement a short length of the cloth is, however, exposed above the gangway as it passes from one enclosure to the other, but the conditions are very satisfactory as an adequate exhaust is provided operating at floor level in both enclosures. The new draft regulations propose that arrangements such as the above should be compulsory.

Carbide Contract Appeal

Hearing Concluded: The Judgment

On July 28, the Court of Appeal delivered judgment in the action of the Acetylene Corporation of Great Britain against the Canada Carbide Co., which was for damages for alleged breach of contract of July, 1916, by defendants to supply large quantities of calcium carbide to the plaintiffs for re-sale to the Government (*See* The Chemical Age, Vol. IV., pp. 290, 309 and Vol. V., pp. 70 and 91). Defendants pleaded that a suspension clause in the contract operated by reason of their inability to obtain transport. Mr. Justice Rowlett held in favour of the defendants. Their Lordships, Lords Justice Banks, Warrington and Scrutton, held that the defendants had committed a breach of agreement; as to control they were liable to the plaintiff in such sum as might be awarded by the referee as damages for the breach. A long continuance of periods during which deliveries were suspended had so affected the identity of the contract that it was no longer binding on the parties; that the defendants were relieved under the clause in the contract from the obligation to give the plaintiffs the first refusal of next year's calcium carbide, and that Mr. Justice Rowlett was justified in refusing relief under that head; that the plaintiff could not in the present action recover directly for alleged breach of an earlier contract, but must prove a breach of the contract of July, 1916, which should have been completed about December, 1916, and that the plaintiffs were not entitled to treat a short delay which occurred after December, 1916, before deliveries commenced, as a breach of contract.

Mr. Justice Rowlett's judgment was varied accordingly, each party being accorded the costs of the issues on which they succeeded and each being given costs of their appeal.

An Agencia Americana message from Santiago under date of July 12, states that the Minister of Finance, addressing the Senate, gave the assurance that the Budget deficit for 1920-21 would be covered by the revenue accruing from the Nitrate Taxes.

Munition Works Explosion

Rainham Chemical Company's third Appeal against Damages Dismissed

In the House of Lords on July 28 Lord Buckmaster, Lord Sumner, Lord Parmoor, Lord Wrenbury and Lord Carson dismissed the appeal of the Rainham Chemical Works, Ltd. (in liquidation) and S. J. Feldman and R. W. Partridge from judgments of the High Court and Court of Appeal awarding damages against them in an action by the Belvedere Fish Guano Co., Ltd., for £10,547. Lord Justice Scrutton, before whom the case was originally heard, regarded both sets of defendants as responsible and entered judgment against them accordingly. The Court of Appeal were unanimous in holding that the Rainham company was liable, and the majority (Lord Justice Younger dissenting) held further that Messrs. Feldman & Partridge were also liable.

The claim arose out of an explosion which occurred in September, 1916, at the Range Works, Rainham, Essex, causing loss of life and serious damage to adjoining property. Some of the premises damaged were owned by the respondents, who instituted proceedings to recover compensation for their loss. They originally made the Rainham Chemical Works, Ltd., defendants to the action and sought to establish liability against them on the ground that they were in occupation of the works and had brought on their land quantities of dangerous substances. The plaintiffs subsequently added as further defendants Messrs. Feldman and Partridge, alleging that they, with other persons and the defendant company, were in occupation of the land, or that the company was in occupation on their behalf. The answer put in was that the company were employed as servants or agents of the Ministry of Munitions, that there was no negligence, and that the materials which caused the explosion were not in themselves dangerous.

The circumstances in which the premises were being used for the manufacture of explosives at the time of the accident were as follow:—In 1915 the two appellants, Feldman and Partridge, became aware of a process, invented by two foreign chemists named David Maron and George Wyss, whereby picric acid could be manufactured from dinitro-phenol and nitrate of soda. The then well-established method of manufacture involved the use of nitric acid, and, owing to the scarcity of this substance, the new process appeared to be one of great national value. Messrs. Feldman and Partridge, together with one Oliver de Gerde, accordingly obtained the benefit of an agreement dated July 14, 1915, with Messrs. Maron and Wyss for the benefit of their services and the rights of patents and inventions held in connexion with the process. They secured on August 24, 1915, from the Ministry of Munitions, a contract by which they were, at their sole risk and on their sole responsibility, to make into picric acid quantities of dinitro-phenol delivered to them by the Minister. They were to be paid 2d. a pound for their services and such further profits as they might make by the sale to the Minister of the picric acid at a price not exceeding 3d. a pound, for sale to Russia, Italy and France; they were to be at liberty to manufacture on their own account.

Messrs. Feldman and Partridge obtained a tenancy agreement of the land on which the factory was to be established from J. C. and J. Field, Ltd., and this they effected on September 10, 1915, the term being one year from September 1, 1915, and thenceforward until six months after the declaration of peace. In this agreement there was an express provision that the tenants were not to assign, underlet, or part with possession of the premises or any part thereof without the consent of the landlords, excepting to a Government Department. Messrs. Feldman and Partridge then executed the necessary work upon the premises. These they divided into two parts; one called the Range Works, where the picric acid was to be manufactured for the Government, and the other called the Rainham Works, for the manufacture of picric acid which they were at liberty to export.

Lord Buckmaster, in moving that the appeal should be dismissed, said the company were in occupation of the premises as agents for the vendors, and unless Messrs. Feldman and Partridge were in a position either to establish that possession or to show that they had never in fact parted with possession, they would have forfeited the lease and been unable to obtain

any relief against the forfeiture or any compensation for the work they had done. It was essential in relation to their landlords that they should not give up possession of the property. The landlords had themselves thought that the property had been dealt with, and had received an express assurance on behalf of Messrs. Feldman and Partridge that it had not in fact been assigned or underlet. Permission to assign was asked, but was never granted. In these circumstances he could not satisfy himself that Messrs. Feldman and Partridge had ever divested themselves of occupation of their property.

Lords Sumner, Wrenbury and Carson concurred, and the appeal was dismissed with costs.

Nobel Industries, Ltd.

Reorganisation of Business

In the course of his speech at the ordinary general meeting of Nobel Industries, Ltd., held at Winchester House, Old Broad Street, E.C., on July 29, Sir Harry McGowan, K.B.E., chairman and managing director, referring to the recent reorganisation of the business, said the purpose of the merger was to obtain the following advantages :—In the factories : (1) To reduce production costs and overhead charges by concentration of manufacture in the most suitable places, (2) to be able at no greater overhead cost to have everywhere the highest technical advice, (3) to buy more cheaply and to economise by holding smaller stocks of raw material. In the selling organisation : (1) To eliminate competition in advertising, and increase efficiency in that direction, (2) to effect savings in distribution expenses, *i.e.*, commissions, magazine charges, carriage, &c. In the office organisation : (1) To establish a common form of costing in order to get the advantage of comparability, (2) to get the best advice and establish a common line of action in fiscal matters, (3) to concentrate in a central modern office building, with consequential time-saving and efficiency. In finance : To get better knowledge and advice in regard to employment of surplus funds and on general questions of foreign exchange, to save interest, and to economise in current bank balances. As the result of two very strenuous years' work, he was glad to say that to a large extent these objects had been attained.

Referring to the report of the sub-committee under the Profiteering Acts, Sir Harry McGowan said the directors had supplied the sub-committee with a considerable amount of information which was not referred to in their report, apparently because they had not had time to verify it. Where they furnished detailed costs of particular products specified by the committee, in no case did it appear that the ratio of profit now being made was equal to that made before the war. He thought it would have been a more gracious act on the part of the committee, and possibly even more judicial, if these facts had been mentioned by them, with the addition of any saving qualifications they might have desired.

With regard to the company's industrial investments, the chairman said the investment in the British Cellulose & Chemical Manufacturing Co., Ltd., was just over £300,000, and represented only 6·1 per cent. of the total capital. Their investment in the British Dyestuffs Corporation, Ltd., which again was relatively small, having been acquired at a cost of slightly over £200,000, represented only 3·4 per cent. of their total capital. In view of the fact that the Government permitted the importation of German dyes, coupled with the depression in the textile trade, the British Dyestuffs Corporation had had a bad time recently, but their directors naturally expected that proper solicitude for the company's interests as against foreign competition would be shown by the Government.

They did not invest in these companies with an eye to capital appreciation or depreciation but decided, after due deliberation, that these were companies in which they could hold permanent investments, not only giving them substantial revenue, but which would have most important trading effects in their whole scheme of operations. The largest remaining investment of a marketable character was their holding in Canadian Explosives, Ltd., which continued to operate most successfully despite the adverse conditions.

Alluding to the prospects for this year and the immediate future, Sir Harry McGowan said it was clear that the manufacturing companies in this country had lost three or four months' profits by the coal deadlock, and surely the experience of that stoppage would lead one to expect that we should not see its repetition, and that we might reasonably look for a period of industrial peace. That would establish confidence and enable manufacturers to make their plans longer ahead than had been the case during the past two years. It would also give the buyer added security as to delivery, and thus help to re-establish confidence, which would be reflected in buyers now standing off coming again into the market.

There was no doubt of our ability as a country to re-establish our position, but that could only be done by a saner appreciation of the necessity of efficiency, which meant greater production, low costs, lower selling prices, and, consequently, increased purchasing power. It was, he thought, a matter of regret that something could not be done to restore the commercial equilibrium of the world by re-establishing the buying powers of the stricken countries of Europe. If the British Government and the United States Government got together in this matter they could take such safeguards that the rendering of financial assistance would not be attended by such difficulties as appeared almost insuperable at the moment. Until this was done we could not hope for a full restoration of the world's trade, and in particular of the great export trade upon which our own country was so dependent.

Extraction of Chlorophyll

Green plants when dried carefully, contain about 2 per cent. of chlorophyll combined with oils, fats and waxes as well as with phytosterol, a vegetable form of cholesterol. Chlorophyll is soluble in oils, alcohol and ether, and when either the fixed or volatile oils are extracted from vegetable materials they are often coloured green by the dissolved chlorophyll. According to Dr. E. W. Pearce, writing in the *American Perfumer*, the extraction of this green colouring matter from plants is a matter of care and precision, because there is so much danger of the product being contaminated by other materials. The chemically pure substance has been obtained in the form of bluish black crystals having metallic lustre, but the commercial pure grades are generally in the form of dark grass-green pastes, probably representing the compound of chlorophyll and phytosterol. Many grades contain yellowish or brownish waxy matters that lower the value of the product to a considerable extent, hence a colorimetric test is necessary to determine the value of any given sample. Chlorophyll normally contains magnesium as an essential component, but this may be replaced by other metals to give various other properties. Some varieties have been so modified that they are no longer soluble in oil and alcohol, but are soluble in water, without a loss in any of the original properties. The strength of oil soluble chlorophyll may be determined by dissolving a definite weight in pure wood alcohol or benzol and comparing it in a glass cylinder with a standard. By diluting the stronger solution until the two match in shade, the strength of the samples is inversely as the volume of the solutions. For the water soluble varieties the same method is used, substituting distilled water for the alcohol.

Chemical Traders and Key Industries

The following resolution has been unanimously adopted by the Executive Council of the Chemical and Dyestuff Traders' Association, and copies have been forwarded to the President of the Board of Trade and other Ministers :—

"The Executive Council of the Chemical and Dyestuff Traders' Association strongly protests against the continued policy of forcing the Safeguarding of Industries Bill through the House of Commons without proper opportunities for discussion and consideration, and in the event of the Bill reaching the House of Lords earnestly requests that a Bill vitally affecting the trade and commerce of the country should be referred back to the House of Commons for the full and detailed examination that such important proposals are entitled to receive, and for such amendment as may be proved to be absolutely necessary if the trade of the country is to be restored."

German Dye Litigation

Controllers to Reject all Claims

IN the Chancery Division on July 28, Mr. Justice Russell delivered a reserved judgment in test actions brought by British companies against the controllers of half-a-dozen companies established in England for the sale of German dyes, claiming damages in many millions of pounds sterling for alleged breach of pre-war contracts.

The claimants were the Calico Printers' Association, Ltd., the Bradford Dyers' Association, Ltd., the British Cotton & Wool Dyers' Association, Ltd., Scott & Co., Ltd., and the executors of Thomas Welch, and the respondents were the controllers of the Badische Co., Ltd., the Bayer Co., Ltd., the Greisheim Elektron, Ltd., Kalle Co., Ltd., the Berlin Aniline Co., Ltd., and Meister, Lucius, & Bruning, Ltd.

The defence of the companies was that as they were dissolved on the outbreak of war because they were enemies a continuation of the contracts would involve intercourse with the enemy, which was illegal, and that the contracts being suspended the time for claiming damages had not arrived.

The claimants replied that they treated the companies as principals, and not as agents, of the German firms who formed them, and that even if the suspensory clauses came into operation there had been an anticipatory breach of the contracts by reason of the winding-up orders, which put it out of the power of the companies to carry out the contracts.

Mr. Justice Russell said that the number of contracts was legion, and thirty-one had been selected, so that he had really been trying thrity-one actions for breach of contract. The contracts were divided into two groups, one for the supply of indigo, and the other for the supply of other colours. Taking the case of Bayer & Co., who sold indigo, he was of opinion that it was English in form only. Whenever a judgment or decision was required with regard to contract prices it was to be the judgment or decision of the German concern, and, in fact, right down to the outbreak of war and control, the business and acts of the English company were at the mercy of the German directors and shareholders. The true test was whether at the outbreak of war the control of the English company was in the hands of persons resident in an enemy country, and the company assumed an enemy character. It seemed to him that Bayer & Co. must at the outbreak of war have assumed an enemy character, and that the contracts with them then became dissolved. Nor did the existence of the suspensory clause in the contracts assist the claimants. He was satisfied that there were to the knowledge of the claimants contracts for the supply of goods from Germany, and that at the outbreak of war the fulfilment of them would have involved intercourse with the enemy, which was illegal, and on this ground also the claim for damages failed. The suspensory clause was never intended to apply to a war between England and Germany. The commercial object of the contracts was frustrated by the war, and they came to an end.

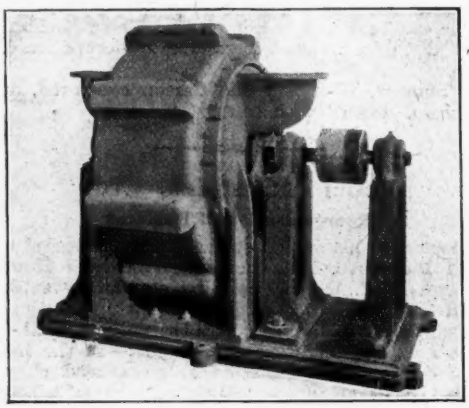
Bayer & Company had the best chance among the respondent companies to escape the enemy taint, and where they had failed the others could not hope to succeed. The indigo contracts were four in number, and they possessed the distinctive feature that they related to the sale of a colour manufactured in this country down to the war by Meister Lucius & Bruning, Ltd. The essential ingredient phenolglycine for the manufacture of synthetic indigo was, however, supplied from Germany, and could only be procured from there. That fact was notorious in the indigo trade. The indigo was either manufactured in Germany or manufactured here with materials unprocurable except in Germany, so the source of supply stopped absolutely when war broke out.

He saw no difference between these contracts and the others, and directed the controllers to reject all the claims and pay the costs of all parties out of the assets.

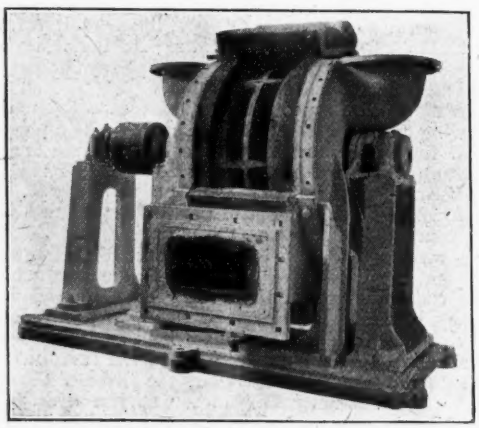
BEFORE the introduction of FOREIGN DYES to China, the native manufacturers made use of from 60 to 70 per cent. of the indigo produced in the country. German dyes had a very good market in China prior to the war. In fact, their popularity had the effect of almost driving out of existence the native use of indigo; an effort is now being made to revive the industry in Hupeh.

A New Centrifugal Fan

THE accompanying illustrations show the new armoured Ceratherm Centrifugal Fan or Ventilator or Exhauster produced by Guthrie & Co., chemical engineers, of Accrington. This fan presents certain novel and advantageous features.



The Ceratherm portions, which are quite indifferent to any acid gas and are not affected by variations of temperature, are worked into the iron to give a one-piece effect and are not detachable from the main halves. The impeller makes a perfect fit with the sides of the fan which are machined. Double suction is obtained with this impeller, which is of a most substantial character. The race is detachable. Even in case of accident the fan casing, it is claimed, cannot be injured. The capacity is about 2,000 feet per minute at about 8 in. water



gauge suction on the closed end running at 1,500 revolutions. Self aligning Skefko ball bearings are used.

It should be noted that the impeller is in one solid piece with a steel interior and that there are no joints of any kind exposed to the acid gas. It is claimed for the new plan that in design and construction it marks a distinct advance in several points.

Catalogues Received

Necol Industrial Collodions, Ltd., 62, London Wall, E.C.2, a constituent company of Nobel Industries, Ltd., send us a small folder describing their "Necol" plastic wood for use by engineers, pattern makers, &c. According to the manufacturers, it is a mouldable material of the consistency of thick paste, which hardens on exposure to the air into a tough, solid, waterproof substance. It is claimed for it that when applied to a clean, dry foundation of wood or other material it adheres firmly, not showing any tendency to powder or blister, even when exposed to moderate heat.

Disputed Quality of Starch

BEFORE Mr. Registrar Dell, in the Mayor's and City of London Court, on Thursday, July 28, a claim was made by Snowden & Sons, Ltd., chemical manufacturers, 85, Gracechurch Street, E.C., against M. Bilcliffe, 7, Gayford Road, Shepherd's Bush, for £1 17s. for starch supplied. A representative of the defendant stated that the amount of the debt was not admitted, the defendant having written to the plaintiffs, asking them to take the starch away, on the ground that it was not up to the quality she required.

Plaintiffs' witness said they had never heard anything of the kind until now.

Defendant's witness said it was not disputed that starch was delivered, but what was wanted was table linen starch, and that had not been delivered. The starch which had been delivered was still at the defendant's place waiting for the plaintiffs to take away. Plaintiffs' representative said they were quite willing to take the starch back, provided the defendant would return it carriage paid. There had been 56 lb. of starch sent to the defendant.

The Registrar thought the better way to get rid of the plaintiffs' claim was for the defendant to pay a small sum for carriage to settle the matter. It was more reasonable to do that than to chance "getting home" upon the defence. The case was accordingly adjourned for the defendant to return the starch.

Canadian Glass Industry in 1918

THE Mining, Metallurgical and Chemical Division of the Canadian Bureau of Statistics has just issued an account of the glass industry of the Dominion in 1918, from which it appears that during 1918 nine firms were engaged in the manufacture of glassware; of these six confined themselves to the manufacture of lamp and lantern chimneys, drinking glasses, bottles and other pressed and blown glassware; two to vials and chemical glassware, and one to sheet glass. The total production of glassware was valued at $6,578,602, of which ware to the value of $35,367 was exported. On the other hand, Canada imported glassware to the value of $5,430,873, showing that the country produced only 54·9 per cent. of its actual requirements. The total capital invested in the industry was $7,443,525, employment was given to 2,322 men and women, and $2,221,563 was paid in wages. The raw material consumed was valued at $2,056,739 and the fuel at $598,886. Miscellaneous expenditure chargeable to manufacturing amounted to $989,747, so that the total expenditure was $5,882,295.

German Chemical Dividends

THE Dynamit Aktiengesellschaft Nobel & Co., of Germany, has declared a dividend of 16 per cent. and intends to increase its capital from 72,000,000 to 100,000,000 marks, the new stock sharing in profits of the present year. The Rheinische Westfalische Springstoff has declared a dividend of 12·8 per cent. and will increase its capital from 26,000,000 to 40,000,000 marks. The Siegener Dynamit Fabrik has declared a dividend of 12·8 per cent., and will increase its capital from 1,208,000 marks to 1,800,000 marks. The Chemische Fabriken Borm Weiler-Ter-Meer has declared a dividend of 18½ per cent.

Muscle Shoals Nitrate Plant

ACCORDING to *Drug and Chemical Markets* the Du Pont and other interests are negotiating for the purchase of the United States Government's war time nitrate plant at Muscle Shoals, Alabama, and probably will compete strongly with Henry Ford, who has already transmitted to the Secretary of War his proposal to buy the plant. Mr. Hoover said that while the Du Pont Co. had not made a specific offer to him, it was indicated that they were manœuvring to obtain the plant. Until actual proposals were made, however, Mr. Hoover declined to discuss details of any offer which may have been suggested. It will be remembered that Mr. Ford's proposal was to take the lease of the plant for 100 years at a rental of approximately £3,000,000 per annum, besides paying something like £1,400,000 for the land and buildings.

Government Contracts

THE following were among the Government Contracts let during June:—

WAR OFFICE.—*Cement*: Cement Marketing Co., Ltd., London, E.C. *Driers, Liquid, Lead Free*: Jenson & Nicholson, Ltd., Stratford, E. *Linseed Oil, Raw*: Younghusband, Barnes & Co., Rotherhithe, S.E. *Vat Casks*: Tyson & Co., Millwall, E.; W. Ryan & Co., London, E. *White Spirit*: Union Petroleum Products, Ltd., Silvertown, E.

AIR MINISTRY.—*Bearings, Research Works On*: D. Napier & Son, Ltd., London, W. *Salt for Water Softening*: Salt Union Co., Liverpool. *Tar*: Crow, Catchpole & Co., Ltd., Barking. *Varnish and Dope*: The British Emaillite Co., Ltd., London, N.W.

POST OFFICE.—*Ebonite*: North British Rubber Co., Ltd., Edinburgh.

CROWN AGENTS FOR THE COLONIES.—*Cement*: Cement Marketing Co., Ltd., London, E.C. *Varnish*: Wilkinson, Heywood & Clark, Aldwych, W.6.

HIGH COMMISSIONER FOR INDIA.—*Plant, Sterilising*: Manlove, Alliott & Co., Ltd., London, S.W. *Varnish, &c.*,: Wilkinson, Heywood & Clark, London, W.C.; R. Ingham Clark & Co., London, E.C.

ORDNANCE SURVEY OFFICE.—*Alcohol, Absolute*: James Burrough, Ltd., London, S.E.

Obstruction on River Bank

AT the Dartford Petty Sessions last week Mr. R. H. Wilson, manager of the Belvedere Works of Borax Consolidated, Ltd., was summoned for wilfully obstructing the river embankment at Erith on June 28, by having a truck rail laid across the pathway on trestles leading from the jetty to the works. Defendant said they had unloaded the coal by this method for 18 years, and no objection had ever been raised. They were willing to do anything to meet any objection against the practice.

Mr. W. A. Duckworth submitted that the defendant had a perfect right to place the rails across the footpath at certain times for certain purposes. They had purchased the land on which the foorpath lay, and he produced the deeds referring to the property. The firm recognised that the public had a right of way, but the obstruction was of a temporary and trumpery character.

The Chairman said the Bench were of the opinion that there was a trifling obstruction and defendant would have to pay a fine of 20s.

U.S.A. Artificial Silk Plant

MANUFACTURE of artificial silk has been begun at the new plant of the Du Pont Fibersilk Co., located on the Niagara River at Buffalo, N. Y. At present the plant is producing 1,000 lb. per day of 150 denier, which is one of the most widely-used sizes of thread, but both the finer and coarser counts will be made in accordance with the demands of the trade. The product has already been tried in several of the manufacturing industries using this size, such as those producing hosiery, fancy knitting, sweaters, neckties, broad silk weaving and others. The output of the plant will be increased from now on up to capacity, which will be in the neighbourhood of 1,500,000 lb. of artificial silk per year. All the product will be sold in the form of skeins and will go direct to manufacturers. When in full operation, the plant will employ approximately 600 operatives, about half of whom will be women. The Du Pont Fibersilk Co., which is a subsidiary of E. I. du Pont de Nemours & Co., owns 100 acres of ground on the Niagara River between Buffalo and Tonawanda and has installed its own facilities, including water supply, sewerage, &c.

Petition for Liquidation Adjourned

THE petition of Mr. Maxim Hanson Hersey, chemical engineer, for the compulsory liquidation of the Convex Incandescent Mantle Company, Ltd., was before Mr. Justice P. O. Lawrence in the Companies' Winding Up Court on July 26. Mr. Clausen K.C., said it was desired that some of the witnesses should be cross-examined on points in the petition on which the evidence was conflicting. He therefore asked for another adjournment. His lordship adjourned the petition until the Michaelmas Sittings.

Chemical Matters in Parliament

Key Industries Bill

IN the House of Lords on Tuesday Lord Crewe moved :

"That His Majesty's Government, having declared their intention of passing into law certain measures of great public importance which can only be adequately examined through prolonged discussion, this House declines to proceed until the end of October with any Bills not yet read a first time, and directs that the further proceedings on any Bill read a first time after the passing of this resolution shall be postponed until Tuesday, November 1st next ; provided that this resolution shall not apply to the Railways Bill or to the further proceedings of any Bill entered on by general consent."

In the course of his reply to Lord Crewe, Lord Curzon said he could not help thinking that the measure which the Marquis of Crewe had really in his mind was the Safeguarding of Industries Bill, which the Government were pledged to pass. The situation in respect to the industries affected was much worse than it was a year ago. Up to the end of 1920 there was a certain upward movement and recovery in trade, but at that time there was a violent drop, and the country found itself in a serious position. Our trade was just now again showing signs of recovery, and the one thing in the way of the successful promotion of that recovery was the feeling that the traders were liable to be swamped by goods coming in from Europe at abnormally low prices owing to the low rate of exchange. For these trades the sooner the Bill was passed the better.

Under the Bill a Committee was to be set up to examine into the conditions of the various industries threatened, and all this would take some time ; and it was obvious therefore that this protection should be given speedily, and that the Committee should be set up and report as soon as possible. Then the last object of the Bill was the prevention of dumping. These cases were not as numerous as others, but there might at any time be a sudden dumping of articles. Here again a Committee would be set up to investigate, for if time were lost serious injury to trade might be caused.

On a division the motion was lost by 79 votes against 104.

Monasite Sand

Replying to Sir J. D. Rees (House of Commons, August 2), Mr. Montague said that no foreign-owned company controlled the sale of monasite sand in Travancore State or elsewhere in India.

Leadless Paints

Captain Bowyer (House of Commons, July 27) asked the Home Secretary what were the composition and terms of reference of the fresh Committee which he had promised to appoint to examine the recent further evidence as to the results obtained with leadless paints ?

Mr. Shortt said he was not in a position yet to announce the composition and terms of reference of this Committee, but hoped to do so shortly.

Alkali Industry

Mr. Myers (House of Commons, August 1) asked the President of the Board of Trade when the report of the sub-committee on the alkali industry, appointed by the Standing Committee on Trusts would be published ?

Mr. Baldwin said it had been decided not to publish this report. The sub-committee were unable, owing to the expiry of the Profiteering Act on May 19, to conduct an exhaustive investigation, and it was not desirable to publish an incomplete report.

Zinc Concentrates

Mr. Hogge (House of Commons, August 2), asked what was the total liability of the Government in respect of the zinc concentrates purchased from the Zinc Producers' Association, Australia, and what steps the Government proposed to take to dispose of those concentrates.

Sir William Mitchell-Thomson said all concentrates delivered to H.M. Government to date by the Zinc Producers' Association had been paid for. As regards the last part of the question there were at present no inquiries for the purchase of these concentrates at prices which he was prepared to accept, but it was hoped that a sale might be effected shortly of concentrates in Australia for smelting there.

Tariff Changes

AUSTRALIA.—Scientific instruments and apparatus and material for scientific purposes for use in universities, &c., of a quality or kind which cannot reasonably be manufactured within the Commonwealth or in the United Kingdom, may be imported free of duty. The latest modifications in the import duties, which are in three grades, *i.e.*, British Preferential, Intermediate (not yet operative) and General, include acetone (*ad valorem* duty of 30 (Preferential), 35 (Intermediate), or 40 (General) per cent.) ; wood naphtha and methyl alcohol (per gallon 2s., 2s. 6d. and 3s.) ; alloys and amalgams (*ad valorem* 20, 25 and 25 per cent.) ; and thermit and other welding compounds (*ad valorem* 20, 25 and 30 per cent.).

POLAND.—The exportation of yeast ; salt of all kinds ; manures and bones ; and metallic ores and minerals of all kinds is absolutely prohibited. Any existing permits in respect of any of the above-mentioned articles will not be renewed on the expiration of the period of validity.

ROUMANIA.—A copy of a new Customs Tariff which aims at making the new import duties more proportionate to the increased values of imported goods and also with a view to protecting home industries may be inspected at the Tariff Section of the Department of Overseas Trade. The Department, however, is prepared to furnish information as to the new rates of duty on any specified class of merchandise in response to written applications from British exporters.

SAN SALVADOR.—The import duty in perfumery is increased to $3 per kilog, while the duty on soaps, oils, pomades, &c., is now $1·50 per kilog.

SPAIN.—The exportation of petroleum and gasoline is now prohibited. An export duty of 2 pesos per 100 kilogs has been imposed on the export of ground nuts, hemp seed, and other oleaginous seeds, and common soap. Cement to the extent of 100,000 metric tons may be exported without payment of export duty. Oil made from the refuse of olives (*aceite de orujo*) must be exported by the manufacturers and through the same Customs Houses as olive oil. Under a special regime olive oil may be exported up to a quantity of 20,000 metric tons.

A Solvent Medium for Wax

PROFESSOR STEHNER, of Munich, writing in the *Farben Zeitung* on solvents for waxes, says that liquid hydrocarbons do not dissolve wax very well ; relatively speaking, benzine and petroleum ether are the best means for this purpose. Alcohols, aldehydes, and ketones are very bad dissolvers of wax, whilst ethers rank on about the same level as hydrocarbons, and, in this respect, the action of terpenes on wax is also unsatisfactory. Sebacic acid esters are by far the best wax solvents, but the esters of aromatic acids are much inferior to them. Of the sebacic acid esters the least capable of dissolving wax are the formic acid and methyl ester classes ; with a rising boiling point the wax-dissolving power increases, but, if a certain maximum be exceeded, then this power again decreases. The sebacic acid esters which dissolve wax well have a density of 0·87-0·91 and boiling points of about 75° to 178° Celsius ; the best esters for dissolving wax are:—Propion acid, propyl ; valerian acid, ethyl ; propion acid, butyl ; acetic acid, amyl ; butyric acid, propyl ; butyric acid, butyl ; propion acid, amyl ; and valerian acid, propyl. Just in the same way as these esters possess a high degree of solubility in wax, so do they also prove excellent media for the dissolving of wax itself. Hitherto tetrachloride of carbon has been regarded as an admirable wax solvent, but, in this respect, it is much inferior to the esters named, and, in some cases, it could be advantageously replaced by amyl acetate.

Affairs of Mann & Cook

IN the London Bankruptcy Court recently before Mr. Registrar Francke the adjourned public examination was appointed to be held of William Mann, Francis Mann and J. P. Hosey, trading as Mann & Cook, produce merchants, at 7, St. Michael's Alley, Cornhill, E.C., and also at 8, Chatham Street, Manchester; Royal Liver Buildings, Liverpool ; 120, Broadway, New York ; Via San Lorenza, No. 11 int., 20, Genoa ; Oppert, 74, Rotterdam, and 247, George Street, Sydney, Australia (*See* THE CHEMICAL AGE, Vol. IV., pp. 282 and 303). The Official Receiver said he could not proceed with the public examination as no statement of affairs had been filed. The examination was therefore adjourned until the last week in October.

From Week to Week

The Italian Cotton Association has protested against the prohibition of the IMPORT OF DYESTUFFS into Italy.

Mr. W. C. REYNOLDS has been awarded the D.Sc. in Chemistry for a thesis entitled "On Interfacial Tension."

We understand that on the invitation of the directors, SIR DAVID YULE has joined the board of the Magadi Soda Co., Ltd.

RIPOLIN, LTD., paint manufacturers, announce that they have taken extensive new premises at 3-9, Drury Lane, London, W.C.

During 1920 the Glasgow Corporation obtained £21,469 from the sale of PREPARED MANURE and waste materials salved from the city refuse.

PROFESSOR W. R. E. HODGKINSON, C.B.E., has been granted a Civil List pension in recognition of his valuable scientific work in the public service.

The annual dinner of the members of the SOCIETY OF CHEMICAL INDUSTRY will be held at the Connaught Rooms, Kingsway, W.C. 1, on October 7.

The Institution of Mining and Metallurgy have REMOVED THEIR OFFICES from 1, Finsbury Circus, London, E.C. 2, to Cleveland House, 225, City Road, E.C.1.

Dr. H. V. A. BRISCOE has been appointed professor of inorganic and physical chemistry at Armstrong College, Newcastle-upon-Tyne, in succession to Professor P. P. Bedson.

The Council of the Society of Chemical Industry have appointed Dr. STEPHEN MIALL as their representative on the Council of the exhibition to be held in April, 1922, by the Coal Smoke Abatement Society.

It is reported to have been discovered in Ceylon that COCONUT SHELLS will yield a valuable non-corrosive antiseptic tar, which forms an excellent vegetable substitute for the acetic-acid creosote used in the preparation of rubber.

CAPTAIN AND MRS. E. M. DE GREEFF, who were married in Canada on July 5, recently arrived in England, and their home-coming was marked by a reception on July 30 at Elm Bank, Sundridge Avenue, Bromley, the residence of the bridegroom's parents.

The Treasury announce that they have determined as from July 28 until further notice the rate of interest to be allowed on sums deposited with the Commissioners of Inland Revenue for the purpose of satisfying any excess profits duty, shall be 4 per cent. per annum.

The schedule of exhibits for the Birmingham section of the British Industries Fair (February 27 to March 10, 1922) has been extended. It includes paints, colours, enamels, varnishes, stains, polishes, lacquers, metal powders, glues and adhesives. Distilling plants are also included.

The Advisory Council for Scientific and Industrial Research have made awards of £180 each for the year 1921-22 to Messrs. J. M'Gregor Robertson, J. A. Mair, and D. C. Brown for RESEARCHES IN CHEMISTRY to be pursued at Glasgow University under the supervision of Professor G. G. Henderson, F.R.S.

At Pontesbury Sessions, Shropshire, on July 29, the ENGLISH BARYTES MINING CO., LTD., Derby, were fined £15 and the manager £10 for failing adequately to ventilate their Builthy Mine, Middleton. While using a petrol engine in the mine the manager and other men were overcome by fumes, one man being carried out dead.

The renewal of the development of the MICA DEPOSITS at Tete Jaune Cache, British Columbia, is announced by a Calgary organisation. These deposits have long been known and shipments were made from them in 1898 and 1899, the dressed mica being taken down by pack train to Kamloops. The ore is muskovite and is stated to be of a high quality.

The City and Guilds of London Institute have recently appointed Mr. Arthur J. Hale, B.Sc., F.I.C., to the Professorship in the Department of Applied Chemistry at Finsbury Technical College, Leonard Street, London, E.C.2. Mr. Hale was chief assistant in the chemistry department from 1917 to 1919 and had been acting head of the department from 1919 onwards.

The address of the Electro Metallurgical Co., Niagara Falls, N.Y., has been changed to the Union Carbide and Carbon Research Laboratories, Inc., Thompson Avenue and Manley Street, Long Island City, N.Y. This change was made necessary by the centralisation of the various research organisations within the Corporation, of which the Electro Metallurgical Co. is a subsidiary.

The death took place on July 27, at the age of 72 years, of Mr. FREDERICK THOMAS HUNT, J.P., of Messrs. Hunt Bros., Aire & Calder Chemical Works, Castleford, Yorks. He was the sole proprietor of the business, of which his father, the late Mr. William Hunt, was the founder. He had been a Justice of the Peace for many years. The interment took place on July 29 at the Castleford Cemetery.

At the Council meeting of the Society of Chemical Industry, held on July 15, it was decided that a MESSEL MEMORIAL LECTURE should be instituted to perpetuate the name of Dr. Rudolph Messel, and that a gold medal with an accompanying honorarium should be presented to the lecturer. It was further agreed that the remainder of the income from the bequest should be allowed to accumulate for the present.

The Royal Society proposes to erect a monument in Portland Place to the memory of LORD LISTER, in recognition of his great services to the cause of science and the alleviation of human suffering. The memorial will be in the vicinity of the house where Lord Lister resided, and will be in granite, on Portland stone, the bust, figures and ornaments being in bronze The necessary funds have already been raised by the Lister Memorial Fund Committee.

Dr. D. SEGALLER, Ph.D., A.R.C.S., of the British Dyestuffs Co-operation, Ltd., who has been associated with the firm since Messrs. Read, Holliday & Sons were acquired by British Dyes, Ltd., is ending his connexion with the Corporation. As head of the Technical Department of the British Dyestuffs Corporation (Huddersfield), Ltd., he has been in charge of a large staff of chemists engaged in research on the various problems connected with the activities of the Corporation.

An Order in Council (No. 24) announces that the MANUFACTURE OF AN EXPLOSIVE consisting of an absorbent carbonaceous material impregnated with liquid air or oxygen shall be exempt from such of the provisions of the Explosives Act, 1875, as relate to the manufacture of an explosive subject to the condition that no person shall manufacture the explosive unless he has obtained a licence from the Secretary of State authorising him to do so and complies with any conditions which may be attached to the licence.

THE ANNUAL GENERAL MEETING of the members of the North of England Institute of Mining and Mechanical Engineers was held to-day (Saturday) in the Wood Memorial Hall, Newcastle-upon-Tyne. The Council have nominated the following for election as representatives of the Institute on the Council of the Institution of Mining Engineers:—Lt.-Col. F. R. Simpson, Professor H. Louis and Messrs. R. S. Anderson, S. Bates, W. Cochran Carr, B. Dodd, M. Ford, R. W. Glass, T. Y. Greener, R. Guthrie, S. Hare, A. M. Hedley, M. H. Kellett, P. Kirkup, C. C. Leach, F. P. Mills, W. C. Mountain, G. Raw, W. Rowley, J. Simpson, R. S. Tate, J. R. R. Wilson, W. B. Wilson and E. Seymour Wood.

Aluminium Facts and Figures

IN the manufacture of apparatus and plant for the chemical and allied industries the lightness, ductility and glass-like resistance to corrosion of aluminium has led to its adoption with satisfactory results; and the development of successful methods of die-casting aluminium, the introduction of the oxy-acetylene method of welding, and the evolution of aluminium alloys with certain special properties, have opened fresh fields of usefulness which have greatly increased the demand for this metal. The British Aluminium Co., Ltd., of 109, Queen Victoria Street, E.C., have issued a new edition of their well-known booklet, "Aluminium Facts and Figures" (price 5s.). In it are contained tables of the physical, mechanical and electrical properties of aluminium and copper, weights of aluminium bar, strip and circles, and limits on the working of aluminium. The tables have been revised where necessary and it is intended to issue further data sheets, in the same loose-leaf form, so that they may be added to the book without difficulty.

References to Current Literature

British

NITRO COMPOUNDS. Heats of combustion and formation of nitro-compounds. Part I. Benzene, toluene, phenol and methylaniline series. *Roy. Soc. Proc.*, June 1, 1921, pp. 213-235.

FUEL. Researches upon brown coals and lignites. Part I. Heat treatment at temperatures below 400°C. as a possible method for enhancing their fuel values. W. A. Bone. *Roy. Soc. Proc.*, June 1, 1921, pp. 236-251.

HYDROGEN; HYDROGENATION. The manufacture of pure hydrogen and the catalytic hydrogenation of oils. E. B. Maxted. *J.S.C.I.*, July 30, 1921, pp. 169-172T.

SODIUM ETHOXIDE. The application of a fractional distillation method in the preparation of sodium ethoxide from caustic soda. T. K. Walker. *J.S.C.I.*, July 30, 1921, pp. 172-173T.

MOLECULAR REFRACTION. Theory of molecular refractions. Part II. Free and activated valencies. G. Le Bas. *Chem. News*, July 29, 1921, pp. 56-68.

RUBBER. Vulcanisation of rubber in sol and gel forms. H. P. Stevens. *Rubber Age*, July, 1921, pp. 251-254.

The regeneration of rubber. P. Alexander. *Rubber Age*, July, 1921, pp. 265-269.

The solubility of crystalline substances in rubber. G. Bruni. *Rubber Age*, July, 1921, pp. 280-282.

OILS. Mineral oil distillation. Part I. Dephlegmation and preheating. *Petroleum World*, August, 1921, pp. 313-320.

ANALYSIS. The estimation of benzole in coke-oven gas and scrubbing oil. L. Shuttleworth. *Gas World*, July 2, 1921, p. 13.

INDIGO. Natural indigo. W. R. G. Atkins. *Science Progress*, July, 1921, pp. 56-70.

ENZYMES. A review of recent work on enzyme action. R. J. S. McDowall. *Science Progress*, January, 1921, pp. 406-434.

United States

SHALE OILS. Studies in Colorado shale oils. A. J. Franks. *Chem. and Met. Eng.*, July 13, 1921, pp. 49-53.

SODIUM SILICATE. Relation of structure to free alkali in sodium silicate solutions. W. Stericker. *Chem. and Met. Eng.*, July 13, 1921, pp. 61-62.

ALLOYS. Note on the properties of antimonial lead. L. J. Gurevich and J. S. Hromatko. *Chem. and Met. Eng.*, July 13, 1921, pp. 62-63.

FURNACE GASES. Constitution of gas atmospheres in aluminium-alloy melting furnaces. R. J. Anderson and J. H. Capps. *Chem. and Met. Eng.*, July 13, 1921, pp. 54-60.

LIME. Outline of lime-manufacturing operations. E. Holmes. *Chem. Age (N. York)*, June, 1921, pp. 227-230.

DYEING. Dyeing in the batik style. Part IV. B. D. Puyster. *Color Td. J.*, July, 1921, pp. 25-31.

Key index for dyestuff intermediates. W. N. Watson and A. R. Willis. *Color Td. J.*; Part II, June, 1921, pp. 234-239; Part III, July, 1921, pp. 35-39.

Union dyeing. Part I. L. G. Hayes. *Textile Col.*, July, 1921, pp. 445-448.

BLEACHING. Bleaching of silk. Part I. E. Cagliostro. *Color Td. J.*, July, 1921, pp. 13-16.

WAXES. Wax and wax compounds. S. Wein. *Metal Ind. (N. York)*, July, 1921, pp. 274-277.

French

PAPER. The utilisation of cellulose waste liquor from the manufacture of paper. H. Braidy. *Rev. gen. des Matières Colorantes*; Part I., May 1, 1921, pp. 65-70; Part II., June 1, 1921, pp. 85-90.

DYES. The constitution of thiofluorescein and its technical applications. T. Maki. *Rev. gen. des Matières Colorantes* June 1, 1921, pp. 81-82.

ALCOHOLS. Syntheses of tertiary alcohols starting from methylethylketone. Pariselle and Simon. *Compt. rend.*, July 11, 1921, pp. 86-89.

ANALYSIS. A new reaction for ammonia. C. D. Zenghelis. *Compt. rend.*, July 18, 1921, pp. 153-155.

REACTIONS. Action of sodammonium on diphenylmethane, fluorene and indene. P. Lebeau and M. Picon. *Compt. rend.*, July 11, 1921, pp. 84-86.

HYDROCARBON DERIVATIVES. Nitro- and amido-derivatives of methylethylbenzene. A. Mailhe. *Compt. rend.*, July 18, 1921, pp. 160-162.

A new method of preparation of sodium derivatives of true acetylene hydrocarbons. M. Picon. *Compt. rend.*, July 18, 1921, pp. 155-158.

CALCIUM CARBIDE. The preparation of calcium carbide from calcium ammonium and acetylene. L. Hackspill and E. Botolfsen. *Compt. rend.*, July 18, 1921, pp. 151-153.

POLYMERISATION. The polymerisation of glucosanes. M. Amé and J. Pictet. *Compt., rend.* July 18, 1921, pp. 158-160.

CATALYSIS. The role of gaseous impurities in the catalytic oxidation of ammonia gas. E. Decarrière. *Compt. rend.*, July 18, 1921, pp. 148-151.

The mechanism of catalytic action. C. Matignon. *Chim. et Ind.*, July, 1921, pp. 7-10.

FATS. The essential characteristics of the principal fats. Part II. M. de Keghel. *Rev. Chim. Ind.*, July, 1921, pp. 206-214.

CORROSION. The corrosion of iron and its suppression by the degasification of the water. G. Paris. *Chim. et Ind.*, July, 1921, pp. 11-32.

OILS. The volatile constituents of oil. A. Delclve. *Chim. et Ind.*, July, 1921, pp. 33-40.

German

RESIN ACIDS. Pinabietic acid, a single resin acid. O. Aschan, K. E. Ekholm, and A. I. Virtanen. Occurrence, preparation, molecular weight and constitution. *Annalen*, July 14, 1921, pp. 117-215.

ALKYLATION. The isomerism of formylphenylacetic ester. Part VI. Alkylation of formylphenylacetic ester. W. Wislicenus and R. von Schrötter. *Annalen*, July 14, 1921, pp. 215-232.

ADSORPTION. The separation of volatile materials from gases which are absorbed with difficulty. Part II.—The capacity of active charcoal for adsorption of volatile organic substances, particularly ether vapour. E. Berl and K. Andress. *Z. angew. Chem.*, July 22, 1921, pp. 377-382.

SPECTRO-CHEMISTRY. Spectrographical investigations of high-molecular organic compounds. R. O. Herzog and W. Jancke. *Z. angew. Chem.*, July 26, 1921, pp. 385-387.

SOLVENT RECOVERY. The recovery of volatile solvents by the Bayer method. H. Carstens. *Z. angew. Chem.*, July 26, 1921, pp. 389-392.

POWER GAS. Production of generator gas. Part I.—Dr. Gwosdz. *Brennstoff-Chem*, July 15, 1921, pp. 209-212.

COAL. Origin and chemical structure of coal Part II. F. Fischer and H. Schrader. *Brennstoff-Chem*, July 15, pp. 216-219.

NITRIC ACID. The technical preparation of nitric acid from the air by means of gas explosions. F. Häusser. *Stahl u Eisen*; Part I., July 14, 1921, pp. 956-962; Part II., July 21, 1921, pp. 999-1003.

Miscellaneous

NITRATION. The nitration of phenyl carbonates, J. M. A. Hoeflake. *Rec. Trav. Chim. des Pays-Bas*, July 15, 1921, pp. 488-518.

HYDROXY COMPOUNDS. The differentiation and separation of *cis*- and *trans*- 1·2-cyclic diols by means of acetone. J. Böeseken and H. G. Derx. *Rec. Trav. Chim. des Pays-Bas*, July 15, 1921, pp 519-425

A new method for determining the relative position of the hydroxyl groups in saturated glycols. J. Böeseken and P. H. Hermans. *Rec. Trav. Chim. des Pays-Bas*, July 15, 1921, pp. 525-528.

ANALYSIS. The titration of iodides by means of permanganate. I. M. Kolthoff. *Rec. Trav. Chim. des Pays-Bas*, July 15, 1921, pp. 532-538.

Patent Literature

Abstracts of Complete Specifications

165,452. HYDROCARBONS, MANUFACTURE OF. C. Weizmann, 41, Campden House Road, Kensington, London, W., and D. A. Legg, 15, Sisters Avenue, North Side, Clapham Common, S.W. Application date, March 7, 1916.

The process is for the production of hydrocarbons of the naphthene series from 2-butene or 3-butene, and the production of butenes from normal primary butyl alcohol. The vapour of butyl alcohol is passed at atmospheric pressure through a tube heated to 250°-320°C. containing pumice coated with aluminium oxide. The product consists principally of 2-butene and 3-butene in the proportions of about 80 and 20 per cent. A theoretical yield of 2-butene alone may be obtained if the temperature is raised to 360°-390°C. The butene is liquefied and then treated with a small proportion of anhydrous aluminium chloride, which acts as a catalyst. The vessel is cooled to prevent rise of temperature during the reaction, preferably to −10°C., the pressure being atmospheric. The butene is polymerised with the production of hydrocarbons of the naphthene series in practically quantitative amount. The reaction may alternatively be carried out under pressure at a temperature of about 15°C. in a jacketed vessel.

165,456. GAS MANUFACTURE. G. Helps, Manor Court, Nuneaton. Application date, March 30, 1918.

The apparatus is for the manufacture of producer gas, blue water gas, and straight coal gas. Coal is admitted from hoppers *A* through valves *B* into an oval or rectangular retort *C*, and the rich gas which is produced is drawn off through a valve *D* and conduit *E* to a hydraulic main *F*. The coke passes downwards through doors *H* in a restricted

Fig. 1.

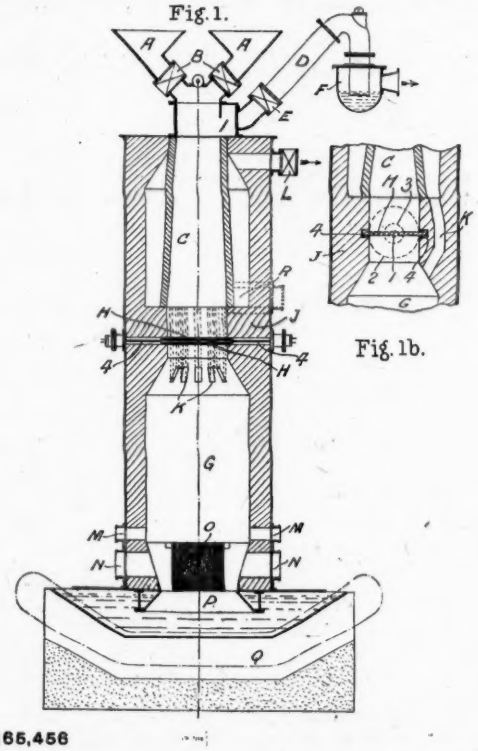


Fig. 1b.

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part *J* to the producer *G*. The doors *H* consists of two slabs of fire-brick or cast iron, which are operated by screws so as to slide in a cast-iron frame 4. The doors are kept cool by the solid brickwork *J*, and they may be made hollow for the circulation of water. Steam and air are passed into the producer *G* through the grate *O*, and the producer gas, blue water gas, or the blow gases are passed through openings *K* into the chamber surrounding the retort *C* to provide the main or auxiliary heat for carbonising the coal. The clinker is finally discharged into a water seal *P* and removed by a conveyor *Q*. In a modification, the retort *C* may be eccentric to the producer *G*, the passage connecting them being inclined. In another modification, an inclined branch passage may be provided in the restricted part *J* for the removal of coke from the retort.

165,604. CHEMICAL MANURE. F. A. Gonzalez, V. V. Sanchez, and E. D. y F. de Llanos, Almonaster la Real (Huelva), Spain. Application date, May 5, 1920.

The fertiliser consists of a graphite mineral which is concentrated or diluted until it contains 14 to 16 per cent. of graphite and then mixed with 5 to 10 per cent. of carbonate of lime. It is found that graphite possesses the property of absorbing about four times its volume of air and converting it into oxides of nitrogen which form nitrates by combination with bases or salts in the soil.

165,616. GASIFICATION OF FUEL. Woodall, Duckham & Jones (1920), Ltd., and Sir A. M. Duckham, 52, Grosvenor Gardens, London, S.W. 1. Application date, May 10, 1920.

In plant of the kind described in Specification No. 164,935 (*see* THE CHEMICAL AGE, Vol. V., page 109), a retort is superposed above a water gas generator and the producer gas made during the blow is used for externally heating the retort, while the water gas made during the run is passed through the retort. Difficulty is found in clinkering the generator in plant of this kind owing to the disturbance in the uniform passage of the coal through the retort. In this invention the air blast is admitted to the generator at the top and passes downwards through the material so that the zone of highest temperature is that in which the percentage of ash is least, and the liability to form clinker is thereby diminished. Steam is then passed through in the reverse direction for the production of water gas so that the zone in which the percentage of ash is highest is cooled, and the steam then passes through the zone of highest temperature and highest percentage of carbon. These are the best conditions for making water gas.

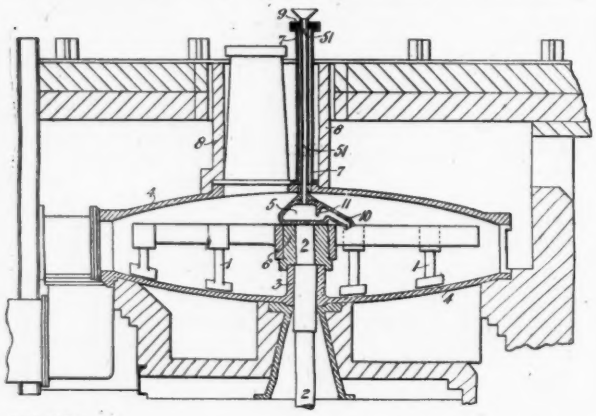
165,635. OILS OR FATS, PROCESS FOR NEUTRALISING. H. W. Salomonson, Lomanstraat 56, Amsterdam, Holland. Application date, May 20, 1920.

It is known that crude vegetable oils and fats may be decolorised and free fatty acids eliminated by dissolving the oil or fat in benzene and treating it with a dilute solution of an alkali, which forms an aqueous solution of soap with the free fatty acid. This process cannot be applied to oils and fats containing a considerable proportion of such acids, since the soap which is formed does not separate out as a lower layer but forms an emulsion in the fatty solution. If such oils and fats containing a large proportion of free fatty acids are purified by treating with an alkaline solution of such concentration that the soap which is formed separates directly in the solid state, the separation of the soap is incomplete and a proportion of neutral fatty matter remains in it. If the percentage of oil or fat is above 8 to 10 per cent. a solid homogeneous mass is formed from which the fatty matter does not separate. In this invention the oil or fat is dissolved in five to seven times its volume of benzene or ether and then treated with concentrated alkali solution. Solid soap is produced and readily separates without the formation of an emulsion. A heavier and more compact precipitate is produced if a solution of sodium silicate is used instead of caustic alkali. The precipitate may be removed and washed with benzene to eliminate the neutral oil. The process is applicable to oils containing more than 20 per cent. of free acids, and detailed examples are given of its application to certain oils.

165,639. HYDROCHLORIC ACID AND SODIUM SULPHATE, APPARATUS FOR THE MANUFACTURE OF. W. Carpmael, London. (From Farbenfabriken vorm. F. Bayer & Co., Leverkusen, near Cologne, Germany.) Application date May 27, 1920.

In the manufacture of hydrochloric acid and sodium sulphate from salt and sulphuric acid, difficulties have been found

in obtaining a proper distribution of the acid with the salt owing to the presence of the stirring mechanism at the centre of the pan, which prevented the introduction of the acid at or near the centre. In this invention the acid is admitted at the centre and distributed by means which move with the stirring mechanism. The stirring device 1 is mounted on the vertical shaft 2 passing upwards through a bearing 3 at the bottom of the pan 4. Acid is supplied through a vertical tube 51 concentric with the shaft 2 to a vessel 5, and is delivered to the pan through an outlet 10. The tube 51



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is surrounded by a sleeve 7 provided with packing material 9 at the top to prevent loss of the acid gas. The vessel 5 is fixed to the boss 6 which carries the stirrers 1, so that the whole device rotates together. The acid is thus delivered into the central zone of salt which is at a lower temperature, so that sodium bi-sulphate is formed in this zone. The bi-sulphate passes into the hotter outer zone where it is converted into neutral sulphate and hydrochloric acid by reaction with the salt.

165,658. TRIPHENYL METHANE COLOURING MATTERS, PROCESS FOR THE MANUFACTURE OF. British Dyestuffs Corporation, Ltd., Imperial House, Kingsway, W.C. 2, W. H. Perkin, 5, Charlbury Road, Oxford, and G. R. Clemo, Organic Chemical Laboratory, South Parks Road, Oxford. Application date, June 23, 1920.

The colours are obtained by the condensation of 2 : 4-dichloro-5-nitrobenzaldehyde and the corresponding 2 : 4 : 5-tri-chlorbenzaldehyde with a mono-alkyl-ortho-toluidine, and the oxidation of the leuco body obtained. In an example, the tri-chlorbenzaldehyde is mixed with monomethyl-ortho-toluidine, ethyl alcohol, and a little sulphuric acid, and the mixture distilled with a reflux condenser for twenty-four hours. The product is rendered alkaline and freed from alkyltoluidine by distilling with steam, and the mixture is then poured into cold water when the leuco compound solidifies. Other monoalkyl-ortho-toluidines may be used, and the tri-chlorbenzaldehyde may be replaced by nitrochlor-benzaldehyde. The leuco compound is dissolved in a mixture of hydrochloric acid, acetic acid, and water, and poured into a large quantity of water. The mixture is stirred, a paste of lead peroxide added, and the mixture again stirred for some time. The mixture is heated to boiling point, mixed with a solution of Glauber salts, and again boiled and filtered while hot. A strong solution of zinc chloride is added, and the mixture evaporated to separate the dye. These colouring matters are of greenish-blue shades and are superior to known dyes of similar shades in their fastness to light.

165,465. FLUORSPAR IN STEEL MAKING. F. Calvert, 2, Clarence Villas, Ashburton Road, Trafford Park, Manchester. Application date, July 16, 1919.

Fluorspar is added to the charge in the manufacture of steel in an acid-lined open hearth furnace, in at least sufficient quantity to neutralise the silicon in the charge. At least one quarter of the amount of fluorspar is added during melting and another one quarter is added during the boiling stage. Boiling is continued until the proportion of carbon is 0·3 per cent. above that required in the steel, and the remainder of the charge is then added in two stages. Boiling is continued until the carbon is reduced to the required amount.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 141,044 (Amalgamated Zinc (De Bavay's, Ltd.)), relating to recovery of lead and silver from ores and metallurgical products, *see* Vol. II., p. 643; 141,688 (Electrolytic Zinc Co. of Australasia Proprietary, Ltd.), relating to electrolytic treatment of ores containing zinc and other metals, *see* Vol. II., p. 699; 142,448 (Ges. fur Chemische Industrie in Basle), relating to substantive ortho-oxy-azo-dyestuffs, *see* Vol. III. p. 78; 143,920 (Elektro-Osmose Akt.-Ges. (Graf. Schwerin Ges.)), relating to a flotation process for concentrating ores, *see* Vol. III., p. 188.

International Specifications not yet Accepted

164,302. BORNEOL. Fabriques de Produits Chimiques de Thann et de Mulhouse, Thann, Alsace. International Convention date, May 28, 1920. Addition to 144,604.

Oil of turpentine is heated with tetrachlorphthalic acid and the resulting ester hydrolysed to produce borneol. It is now found that if the secondary products formed in the reaction of a previous operation are employed as the solvent, the formation of bornyl tetrachlorphthalate is facilitated.

164,310. GAS MANUFACTURE. Soc. du Gaz de Paris, 6, Rue Condorcet, Paris. International Convention date, June 4, 1920.

Coal gas is washed with a solution of a ferrous salt and milk of lime, so that the cyanogen in the gas is absorbed as calcium cyanide and remains in solution, while part of the sulphuretted hydrogen is absorbed by the ferrous salt forming ferrous sulphide. The ferrous sulphide is filtered out, exposed to the air and mixed with sawdust, and is then used for treating the gas again to remove the remainder of the sulphuretted hydrogen. This material consists of ferric hydrate, sulphur, calcium sulphate, calcium carbonate, &c.

164,325. HYDROCARBONS, PURIFYING. J. M. Treneer, 15, Ohio Place, West New Brighton, New York, and C. S. Benjamin, 25, Berwyn Street, East Orange, N.J., U.S.A. International Convention date, June 4, 1920.

Wax or other solid or semi-solid petroleum hydrocarbons are purified by treating them with a solution of sulphur dioxide. If benzol is used as the solvent, it assists in removing the impurities. The material is then filtered off and subjected to heat or pressure.

164,326. THIO-UREAS. Goodyear Tire & Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of W. J. Kelly, 23, North Portage Path, Akron, Ohio, U.S.A., and C. H. Smith, Edgewood Arsenal, Edgewood, Md., U.S.A.) International Convention date, June 5, 1920.

Carbon bisulphide is treated with aliphatic or aromatic amines, such as aniline at a temperature above the boiling point of carbon bisulphide and between the melting and boiling points of the amine. Aniline is mixed with 0·25 to 5 per cent. of sulphur, heated to 88°-92°C., and finally to 110°-115°C., while carbon bisulphide vapour is passed through. The vapour is treated for the recovery of carbon bisulphide by condensing, and then scrubbing with aniline, and the sulphuretted hydrogen may then be absorbed in a caustic solution. When the reaction is stopped, the liquor is heated to 130°-135°C. run into cold water, and steam is passed through to remove free amine. Water is drained off and the product dried. Toluidines, xylidenes, amino-dimethyl-aniline, amino cymene, &c., may be similarly treated.

164,335. AMMONIA SODA PROCESS. F. Jourdan, 186, Via del Babbuino, Rome. International Convention date, June 3, 1920.

Ammonium chloride which is obtained in the ammonia soda process is mixed with finely ground leucite instead of lime, and heated under pressure in an autoclave to obtain ammonia. The residue contains potassium chloride and aluminium silicate.

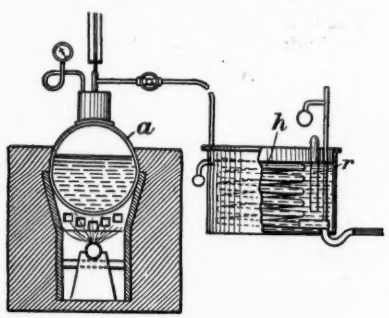
164,357. BORNEOL AND BORNYL ESTERS. L. Darrasse and E. Darrasse, 13, Rue Pavee, Paris, and L. Dupont, 2, Villa David, Vincennes, France. International Convention date, June 9, 1920.

Turpentine is mixed with anhydrous oxalic acid and a

sufficient quantity of a catalyst such as methylene chloride to raise the boiling point of the mixture to 115°-125°C., and heated to this temperature. Other suitable catalysts are chloroform, carbon tetrachloride, ethylene chloride or bromide, tetrachlorethane, or trichlorethylene. Neutral bornyl oxalate is formed, and is separated from turpentine and the catalyst by distilling the latter off in vacuum and then in steam. The ester may be saponified by soda and the solid alcohol oxidised to camphor.

164,358. CRACKING OILS. Standard Oil Co., 26, Broadway, New York. (Assignees of H. P. Chamberlain, 570, Ellicott Square, Buffalo, N. Y., U.S.A.) International Convention date, October 20, 1913.

Petroleum is cracked in a cylindrical still *a*, which is heated at the bottom, insulated at the middle zone, and cooled at the top, or alternatively fitted with a reflux condenser. The pressure is maintained at 30-75 lb. per square inch by means of a throttle valve between the still *a* and the water-cooled



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condenser *h*. Alternatively the throttle valve *r* may be placed at the outlet of the condenser. The process is applicable to oils, such as heavy paraffin distillate, crude oil, residual oils, gas oil, fuel oil, &c., which have a viscosity intermediate between that of burning oil and medium lubricating oil, and the products yield naphtha and burning oil. The amount distilled should be about 2 per cent. of the charge per hour. An asphaltic residue is obtained which may be oxidised for paving purposes or used as a varnish in solution in naphtha.

LATEST NOTIFICATIONS.

166,557. Manufacture of nitric acid. Jubany, R. V. July 20, 1920.

166,558. Manufacture of ceramic masses. Ges. Fur Tuff- Und Ton Technik. July 20, 1920.

166,875. Process of abstracting gases from water by means of metallic filters. Kestner, P. July 22, 1921.

166,877. Devices for utilizing the phenomena of a non-centrifugal inertia produced by a rotatory movement on fluids. Faure, E. July 20, 1920.

166,887. Manufacture of nitrogenous fertilizers. Nicotenzu, K. July 3, 1920.

166,888. Treatment and concentration of ores and the like. Smith, H. Hardy. July 26, 1920.

166,896. Extraction of osoline. Collard, C. July 24, 1920.

Specifications Accepted, with Date of Application

108,319. Drying, purification and cooling of gases, vapours and the like. H. E. Theisen. February 28, 1916.

120,560. Distillation of wood, Treating the volatile products derived from. E. Barbet et Fils et Cie. October 11, 1917.

130,608. Artificial resin and intermediary products, Manufacture of. Resan Kunstharzerzeugungs Ges. March 22, 1918.

140,090. Ammonia and gas, Manufacture of—by distillation of fuel in vertical retorts of rectangular cross section. L. J. Terneden and P. J. Kummel. March 10, 1919.

141,720. Conversion of fatty acids with several double linkages or their glycerides into oleic acid-like fatty acids or their soaps. E. Bennecke. May 6, 1914.

143,185-7. Resin-like substances, Manufacture of. M. Melamid. May 12 and May 13, 1919. Addition to 137,291.

144,721. Continuous and systematic lixiviation. Soc. Generale d'Evaporation Procedes Prache & Bouillon. April 7, 1914.

145,053-6-7. Ortho-oxy-azo-dyestuffs, Manufacture of. Akt.-Ges. für Anilin Fabrikation. January 18, 1918, July 28, 1915, and July 3, 1915.

146,212. Cellulose ester compositions. British Cellulose and Chemical Manufacturing Co., Ltd. June 30, 1919.

146,872. Azo-dyestuffs, Manufacture of substantive. Farbwerke vorm. Meister Lucius and Brüning. April 23, 1914.

166,161. Destructive distillation of carbonaceous substances. E. R. Sutcliffe and Pure Coal Briquettes, Ltd. April 20, 1917.

166,191. Chlorine gas. Controlling or measuring a small flow of. W. Paterson. August 1, 1917.

166,197. Ozone Production of. J. R. Quain. October 18, 1918.

166,198-9. Tunnel furnaces, kilns, ovens and the like. H. Francart. December 19, 1918.

166,202. Activated carbonaceous substances, Producing. E. R. Sutcliffe. February 1, 1919.

166,211. Ozonising substances, Process and apparatus for. E. W. Pattison. (*General Research Laboratories*). March 18, 1919.

166,228. Hydrofluoric acid, Recovery of fluorine as. E. C. R. Marks. (*Catlin Shale Products Co.*) June 18, 1919.

166,229. Filtering, decolorising or purifying processes, and decolorising carbons. J. N. A. Sauer. June 20, 1919.

166,236. Polymerisation of unsaturated fatty acids. Nordiske Fabriker De-no-Fa Aktieselskap, July 25, 1919. Addition to 127,814.

166,249. Copper catalysts. D. A .Legg and M. A. Adam. September 3, 1919.

166,283. Nitro compounds, Reduction of. D. A. Legg and M. A. Adam. December 24, 1919.

166,285. Catalysts and Processes of making them. C. C. Scalione and J. C. W. Frazer. January 7, 1920.

166,289. Chromic oxide and sodium sulphide from sodium chromate, Manufacture of. C. J. Head. January 15, 1920.

166,297. Vat dyestuffs, Manufacture of. F. W. Atack and J. Anderson. February 11, 1920.

166,359. Indiarubber, gutta-percha and the like, Purification of. C. H. Gray. April 15, 1920.

166,396. Perborates, Manufacture of—by electrolysis. H. G. C. Fairweather. (*Fredriksstad Elektrokemiske Fabriker Aktieselkabet*). May 7, 1920.

Applications for Patents

Aitchison, L. Purification of ferro-alloys. 20,036. July 26.

Aitchison, L., and Dyson, W. H. Purification of ores and residues containing oxides of chromium. 20,205. July 27.

,, Purification of tungsten ores and residues containing oxide of tungsten. 20,206. July 27.

,, Purification of ores and residues containing metallic oxides. 20,207. July 27.

Bodman, W. L., and Gettings, S. S. Manufacture of tar macadam. 20,471. July 30.

Burton, D. Preparation of tanning-agent for chrome tannage or dyeing of leather. 20,033. July 26.

Clemm, H., Hangleiter, C., and Zellstoff-fabrik Waldhof. Process for recovery of sulphurous acid and heat from waste gases from pulp-boilers. 19,951. July 25. (Germany, August 2, 1920.)

,, Process of filling pulp-boilers with heated sulphite ly 19,952. July 25. (Germany, September 4, 1920.)

Cumberland Coal Power & Chemicals, Ltd. Production of solid products from ammonia gas. 20,331. July 28.

Dutt, E. E. Extraction of titanium dioxide and alumina from titaniferous bauxite. 20,258. July 28.

Ewbank, W. A., and Faherty, E. J. Universal tool and cutter grinder applicable also for surface work. 20,457. July 30.

Plauson, H. Process for extraction of alkali from felspar, &c. 19,113. July 15.

,, Process for preparing colloids and colloidal solutions. 19,114. July 15.

Godfrey, S. H. Extraction of titanium dioxide and alumina from titaniferous bauxite. 20,258. July 28.

Green, A. G. Process for manufacture of phthalimide. 20,417. July 29.

,, S. J. Process for manufacture of phthalimide. 20,417. July 29.

Jaques, A. Production of solid products from ammonia gas. 20,331. July 28.

Lichtenthaeler, F. E., and Wade, H. Manufacture of alcohol ether mixtures. 20,208. July 27.

Marschner, E. Electrode insertion for mercury-vapour arc rectifiers of glass. 20,504. July 30.

Paterson, W. Apparatus for chlorinating water, &c. 20,276. July 28.

Robert, A. Automatic liquid soap distributors. 19,562. July 20.

Roberts, J. Carbonization of coal. 20,191. July 27.

Schmiedel, T. Manufacture of sulphuric acid. 18,805. July 12.

Society of Chemical Industry in Basle. Manufacture of aminoketones and amino alcohols of the quinoline source. 19,536. July 20.

Techno-Chemical Laboratories, Ltd. Evaporation, concentration, drying, &c. 19,442. July 19.

Thatcher, C. J. Electrolytically oxidizing or reducing substances. 20,254. July 28.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, August 4.

Business is slowly improving, although the turnover remains decidedly small. On the whole, however, the improvement is satisfactory, having regard to the fact that we are at the height of the holiday season.

Export enquiry has been rather quieter and only a limited amount of business is reported.

General Chemicals

ACETONE remains in satisfactory enquiry for both home trade and export. Prices firm and unchanged.

ACID ACETIC is inclined to be a little easier, but stocks are limited and well held.

ACID CITRIC remains weak with little business passing.

ACID FORMIC.—A little more business is reported. Price is unchanged.

ACID TARTARIC is distinctly firmer, but the future position remains uncertain.

BARIUM CHLORIDE still exhibits a drooping tendency and only a nominal business is indicated.

BLEACHING POWDER remains unchanged.

COPPER SULPHATE is still a lifeless market. English makers cannot compete with the depreciated foreign exchanges.

FORMALDEHYDE is steady in tone, and stocks are light.

LEAD ACETATE.—The improvement in export demand is maintained, but the general volume of business remains unsatisfactory and the price is easy.

LEAD NITRATE is unchanged.

POTASH CARBONATE.—There is little enquiry and the market continues to favour buyers.

POTASH BICHROMATE.—There are cheap foreign offers but little business can be detected.

POTASH CAUSTIC is again drooping in price and orders are few and far between.

POTASH PERMANGANATE.—There is no change.

POTASH PRUSSIATE.—Stocks are very small, but the immediate demand is smaller. Price nominal, there is no change.

SODA ACETATE has been in better demand and the price would appear to have touched bottom.

SODA BICHROMATE remains in buyers' favour. Although the demand is rather greater there are still considerable stocks.

SODA PHOSPHATE remains unchanged.

SODA PRUSSIATE.—Little business is reported but stocks are firmly held at recent values.

SODA SULPHIDE is uninteresting.

Coal Tar Products

There is little business passing generally for coal tar products.

90's BENZOL is still very difficult to obtain and is quoted at 3s. on rails for prompt delivery, and for delivery in three to four weeks Benzol can be bought at 2s. 6d.

PURE BENZOL is quoted at 3s. 3d.

CREOSOTE OIL is becoming more plentiful, and the price is 8¼d. on rail in the North and 8½d. in the South.

CRESYLIC ACID remains unchanged, Pale 97-99 per cent being quoted at 2s. 6d. and Dark 95-97 per cent. at 2s. 3d.

SOLVENT NAPHTHA is scarce and is worth about 2s. 8d. to 2s. 9d.

HEAVY NAPHTHA is quoted at 2s. 6d.

NAPHTHALENE shows no change. Crude qualities are worth from £8 to £11 per ton, while refined are worth from £17 to £23 per ton.

Coal Tar Intermediates

Trade has been extremely quiet during the present week as was only to be expected owing to the fact that many works have been closed for several days, and there is practically no change to report in the market.

ALPHANAPHTHYLAMINE remains steady and in quiet demand.

ANILINE OIL AND SALT are both firm with a slightly improved demand on export account.

BETA NAPHTHOL is active without change in value.

DIMETHYLANILINE is quietly steady and supplies seem to be somewhat limited.

DIPHENYLAMINE is without feature and the demand is very small.

H. ACID is inclined to be weaker in the absence of any substantial demand.

NITRO BENZOLE is in fair demand and the price is very firm.

PARANITRANILINE is higher in value, but the demand is light.

RESORCINE is firmer and available supplies are small.

SALICYLIC ACID is moderately active at last quoted figures.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	3	to	0	2	6
Acetone oil	ton	92	0	0	to	95	0	0
Acetone, pure	ton	95	0	0	to	100	0	0
Acid, Acetic, glacial, 99-100%	ton	62	10	0	to	65	0	0
Acetic, 80% pure	ton	49	0	0	to	50	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst	ton	69	0	0	to	70	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	2	4½	to	0	2	5½
Formic, 80%	ton	65	0	0	to	70	0	0
Gallic, pure	lb.	0	4	0	to	0	4	3
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	35	0	0	to	37	10	0
Lactic, 60 vol.	ton	40	0	0	to	42	10	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	0	9	to	0	0	9½
Phosphoric, 1.5	ton	55	0	0	to	57	0	0
Pyrogallic, cryst	lb.	0	7	9	to	0	8	0
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Salicylic, B.P.	lb	0	1	5	to	0	1	6
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	5	to	0	1	6
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	37	10	0	to	40	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	65	0	0	to	70	0	0
Ammonia, muriate (galvanisers)	ton	50	0	0	to	52	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	90	0	0	to	95	0	0
Ammonia, sulphocyanide	lb	0	3	0	to	0	3	0
Amyl acetate	ton	420	0	0	to	425	0	3
Arsenic, white, powdered	ton	50	0	0	to	52	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	16	0	0	to	17	0	0
Nitrate	ton	50	0	0	to	52	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	16	0	0	to		—	
Borax crystals	ton	34	0	0	to	36	0	0
Calcium acetate, Brown	ton	12	0	0	to	13	0	0
,, Grey	ton	19	0	0	to	21	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	90	0	0	to	92	0	0

	per	£	s.	d.		£	s.	d.
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	0	16	0	to		—	
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	29	0	0	to	30	0	0
Cream Tartar, 98-100%	ton	125	0	0	to	130	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	92	10	0	to	95	0	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	6	0	0	to	7	0	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	45	0	0	to	50	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	47	10	0	to	50	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	50	0	0	to	52	0	0
Litharge	ton	38	10	0	to	40	0	0
Lithopone, 30%	ton	28	0	0	to	30	0	0
Magnesium chloride	ton	16	0	0	to	18	0	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	130	0	0	to	135	0	0
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	33	10	0	to	34	0	0
Potassium bichromate	lb.	0	0	9	to		—	
Carbonate, 90%	ton	40	0	0	to	42	10	0
Chloride	ton	38	0	0	to	40	0	0
Chlorate	lb.	0	0	5	to	0	0	5½
Meta bisulphite, 50-52%	ton	120	0	0	to	125	0	0
Nitrate, refined	ton	47	0	0	to	48	0	0
Permanganate	lb.	0	1	4	to	0	1	6
Prussiate, red	lb.	0	2	0	to	0	2	1
Prussiate, yellow	lb.	0	1	2½	to	0	1	3
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	3	5	0	to		—	
Seconds	cwt	3	0	0	to		—	
Sodium acetate	ton	25	0	0	to	26	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	6½	to	0	0	7
Bisulphite, 60-62%	ton	27	10	0	to	30	0	0
Chlorate	lb.	0	0	5½	to	0	0	5¼
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	45	0	0	to	46	0	0
Phosphate, crystal	ton	25	0	0	to	27	0	0
Perborate	lb.	0	1	9	to	0	2	0
Prussiate	lb.	0	0	7	to	0	0	7½
Sodium Sulphide, crystals	ton	19	0	0	to	20	0	0
Sulphide, solid, 60-62%	ton	24	0	0	to	25	0	0
Sulphite, cryst.	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	84	0	0	to	90	0	0
Strontium Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	1	8	to	0	1	9
Tin perchloride, 33%	lb.	0	1	3	to	0	1	6
Tin Perchloride, solid	lb.	0	1	6	to	0	1	9
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	9
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	3	9	to	0	4	0
Alphanaphthol, refined	lb.	0	4	3	to	0	4	6
Alphanaphthylamine	lb.	0	2	9	to	0	3	0
Aniline oil, drums extra	lb.	0	1	6	to	0	1	7
Aniline salts	lb.	0	1	7	to	0	1	9
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	4	9	to	0	5	0
Benzidine, base	lb.	0	6	6	to	0	7	6
Benzidine, sulphate	lb.	0	7	0	to	0	7	6
Benzoic acid	lb.	0	2	3	to	0	2	6
Benzoate of soda	lb.	0	2	3	to	0	2	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	7	6	to	0	8	0
Betanaphthol	lb.	0	2	9	to	0	3	0
Betanaphthylamine, technical	lb.	0	9	6	to	0	10	0
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	4	0	to	0	4	3
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	9	0	to	0	10	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	0
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthalene	lb.	0	1	5	to	0	1	6
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	6	to	0	4	9
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	12	6	to	0	13	6
Paratoluidine	lb.	0	7	6	to	0	8	0
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	7	0	to	0	7	6
Resorcin, pure	lb.	0	8	0	to	0	8	3
Salol	lb.	0	2	9	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Wattle Industry of Natal

THE wattle bark industry of Natal is at present suffering from severe depression, states a *Times* correspondent. Considering the fact that South Africa holds so strong a place as a producer and that wattle bark is the best tanning material known, a recovery to a point that will permit profitable planting should take place within a reasonable period. The only new competitor is the Kenya Colony, where the black wattle comes to maturity in the fourth to fifth year, or about 12 months earlier than in Natal. During the war the bark, which had been shipped from Natal almost exclusively to Europe, found purchasers in the United States, Australia, and Japan, but this widened market has been powerless to save the industry from the general *malaise*. Tanners everywhere are overstocked with bark bought at the top of the market, and not a single extract factory in South Africa is working full time. Opinion in the Union is for the most part in favour of sending the chopped and dressed or ground bark to European manufacturers, who can dispose of the residue after extracting the tannin, the by-products being of use in the making of paper and other articles; whereas in South Africa this residue can be put to no good account. In Kenya, however, the erection of an extracting plant is planned.

Making Dyestuffs in Canada

CANADIAN DYES, LTD., a new company, has been organised to manufacture dyestuffs at Trenton, Ont. This is the first time that any company has entered the manufacturing dyestuff field in Canada. They have secured a two storey brick building on the water-front formerly equipped for the manufacture of pigments, &c. It is anticipated that operations will be at the production stage in the course of a few weeks. A few standard dyes largely used in textile industries will be placed on the market. The officers of the company are C. B. Wright, president; D. R. Stoneleigh, secretary; and D. H. Rice, of New York, vice-president.

Company News

WELSBACH LIGHT CO.—The directors announce a dividend of 5 per cent. in respect of the year ended March 31 last.

JURGENS, LTD.—A dividend for the half-year to June 30 last on the 7 per cent. (guaranteed) cumulative preference shares was payable, less tax, on Tuesday.

ANTON JURGENS.—The directors announce a dividend for the half-year to June 30 last on the 6 per cent. cumulative participating "B" preference shares at the rate of 6 per cent per annum.

ENGLISH VELVET & CORD DYERS.—The directors announce interim dividends at the rate of 5 per cent. per annum on the cumulative preference shares, and 6 per cent. per annum on the ordinary shares, both free of tax.

VAN DEN BERGHS, LTD.—The profits for the year and a half from July 1, 1919, to the end of 1920, including the amount brought forward from June 30, 1919, after deducting all charges amount to £1,624,872, from which £468,750 was appropriated for the issue of 1,875,000 preferred ordinary shares as bonus, leaving £1,156,122 available for dividends. After payment of all preference and preferred ordinary dividends the directors recommend a balance distribution of 4s. per share on the ordinary shares, making 5s. per share for the year 1920, less income-tax, carrying forward £635,929.

LEVER BROTHERS, LTD.—A Stock Exchange announcement states that dealings in the following securities have been specially allowed by the Committee under Rule 148A. These securities will rank pari passu with those in which special settling days have already been appointed, as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted:—206 7 per cent. cumulative preference shares of £1 each, fully paid, Nos. 23,559,902 to 23,560,107; 47 eight per cent. cumulative "A" preference shares of £1 each, fully paid, Nos. 15,468,229 to 15,468, 275.

CONSETT SPANISH ORE.—The net revenue for the year to June 30 last was £12,811. The directors announce a final dividend of 2s. 6d. per share, and £391 is carried forward, making a total undivided profit of £6,673. Meeting, Central Station Hotel, Newcastle, August 6, 1 p.m.

CHEMICAL & METALLURGICAL CORPORATION.—The balance-sheet as at December 31, 1920, shows the following items: Debit—Issued capital, £1,200,000; sundry creditors, £22,260; total, £1,222,260. Credit—Patents and rights acquired, £1,021,854; preliminary expenses, £14,817; leasehold premises and plant, £9,770; stores, £1,250; investments at cost and advances to the François Cementation Co., Ltd., £98,050; ore stocks, £34,988; sundry debtors and payments in advance, £723; cash at bankers and in hand, £21,620; expenditure, £19,188; total, £1,222,260.

NOBEL INDUSTRIES, LTD.—At the ordinary general meeting on July 29 Sir Harry McGowan (chairman and managing director) said the increase in the issued capital since last year amounted to £900,000. The item of £1,100,000 due for constituent and associated companies included the dividends in respect of the calendar year 1920, and sundry loans where they had financed their capital expenditure, while the item of sundry debtors consisted mainly of trade debts. They had received as dividends (after the companies have provided their own corporation profits tax) rather more than £1,200,000 before providing for income tax, which, after deducting income tax and their own expenses, left £850,000. This by no means exhausted the profits that had been earned by the companies, which in a number of cases were considerably in excess of the sums distributed. After providing for the interest accrued on the new note issue up to December, 1920, they brought into the balance sheet for the year, £827,072, which, with the carry-forward from last year, gave a total of £1,057,461. The dividends at the rate of 6 per cent. per annum on the preference shares paid on August 1, 1920, and February 1, 1921, were continued. It was the considered opinion of the board that no dividend should be declared on the ordinary shares on the present occasion. There remains a balance of £757,498 3s. 10d. to be carried forward.

A NEW FEATURE.

CONVENIENCE OF REFERENCE.

OUR new Trade Guide feature commences this week and will be found on another page.

We make no claim to originality in introducing this feature, nor do we think any explanation or sustained precursor is necessary. The immediate success attained without any preliminary fanfare, proves that it is a necessary feature and one which will quickly grow into a very complete and useful addition to the CHEMICAL AGE. Already we have a number of further insertions to make on behalf of well-known manufacturers.

Such a means of convenient reference will undoubtedly be found of very great assistance to our readers generally. Owing to the enormous development of the Chemical Industry and the further influx of trading concerns exploiting all of the many important findings resulting from continuous scientific research, it is well nigh an impossibility for anyone to keep au fait with all the sources of supply of commodities, goods, plant, instruments, services, etc., however long his association with the trade.

The Trade Guide, therefore, will immediately disclose the names of these merchants and manufacturers who are willing and ready to supply any and every requirement.

It will be realised that it is not possible to make it complete and comprehensive from its inception, but it will be added to and revised from time to time, and will, undoubtedly, in a very short time be what its name implies. The further entries which are now to hand will be included next week.

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All manufacturers and merchants should take steps to be represented in the Trade Guide, and full particulars will be sent on application.

TRADE GUIDE

CHEMICAL AGE

ANALYTICAL REAGENTS

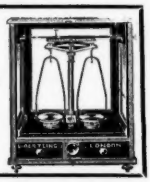
Research Chemicals
THE BRITISH DRUG HOUSES, LTD.,
Graham St., City Rd.,
LONDON, E.C.

ASBESTOS

Pioneers of the World's Asbestos Industry
BELL'S UNITED ASBESTOS Co., Ltd.
Southwark Street, LONDON, S.E.1
(Established 1871)

BALANCES

Oertling
LONDON



Carbons.

NORIT.
THE decolorising carbon and Refining Agent.
30 Times adsorptive capacity of bone char.
In five grades.
JOSEPH BAKER SONS & PERKINS LTD.,
Head Offices: KINGSWAY HOUSE, KINGSWAY, W.C.2
Telegrams: "Bakers, London."

CHEMICAL PLANT

BENNETT SONS & SHEARS, Ld.
43, SHOE LANE,
LONDON, E.C.4.

Centrifuges
Autoclaves
Sterilizers, etc.
CHARLES HEARSON & Co., Ltd.
WILLOW WALK, BERMONDSEY, S.E.

Chemical Plant—(contd.).

Evaporators.

KESTNER PATENT
EVAPORATORS
ACID ELEVATORS
FANS
EXTRACTORS
CRYSTALLIZERS
Kestner Evaporator & Engineering Co. Ltd
5 Grosvenor Gardens,
Westminster, S.W.1.

MULTIPLEX AND SIMPLEX FILM EVAPORATORS.
DISTILLING PLANT.
DRYING PLANT. OIL HARDENING PLANT.
BLAIR CAMPBELL & McLEAN LTD
MAKERS OF ALL TYPES OF CHEMICAL PLANT.

DRUMS AND TINS

JOHN FEAVER,
TOWER BRIDGE ROAD, S.E. 1.
TINS for
PRESERVED PROVISIONS and FOODSTUFFS.
CANS for VARNISH, PAINT.
DRUMS & TAPERS for OILS, VARNISH.
Samples and Prices on application.

FILTERPRESSES

P.F.C.
THE RESULT OF 60 YEARS EXPERIENCE
PREMIER FILTERPRESS Co, LTD.
FINSBURY PAVEMENT HOUSE, LONDON, E.C.2

GENERAL CHEMICALS

CHEMICALS, FERTILISERS
TAR & AMMONIA PRODUCTS
CHAS. PAGE & Co, LTD.
47-51, KING WILLIAM ST LONDON, E.C.

Essential Oils.

KUVROL REG.
Covers Objectionable Smells in Manufacture of White Spirit Turpentine, etc.
CREPIN & DOUMIN, Ltd.
15, COOPERS ROW, E.C.3

HEAVY CHEMICALS

HEAVY CHEMICALS
OF
ALL DESCRIPTIONS
HAMILTON, SON & CO.,
Ironia Chemical Works,
Lilybank Road, Glasgow.
'Phone: South 542. 'Grams: "Ironia," Glasgow.

INSTRUMENTS

BRISTOL'S
RECORDING
GAUGES & THERMOMETERS
J.W. & C. J. PHILLIPS, LTD.
23, College Hill, London, E.C.4

SCIENTIFIC GLASS WARE
DURO GLASS R LONDON
92, FORE ST. LONDON, E.C.

OIL AND FUEL

ANGLO'S FUEL OIL
For Steam Raising: Diesel & Semi Diesel Engines &c.
ANGLO AMERICAN OIL Co, LTD

BRITISH OIL & FUEL CONSERVATION.
FREEMAN MULTIPLE RETORT.
FREEMAN PRECISION TEMPERATURE CONTROL.
Telephone:— Museum 6468.
9, SOUTHAMPTON ST., HOLBORN, W.C.1.

SULPHUR

PRICE, STUTFIELD & CO., LTD.,
6, FENCHURCH BUILDINGS,
LONDON, E.C.3.
Sublimed Flowers.
Commercial Flowers. Fine Ground.
Refined Roll. Refined Rock.
Rough—99/99·5% American.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Notice of Dividend

NEW CHEMICAL CO., LTD., The Union Chemical Works, Rusholme, Manchester. Court: Manchester. First and Final. August 8, 1921, at the Official Receiver's Offices, Byrom Street, Manchester.

Notice of Intended Dividend

ROBINSON, W. (separate estate), The Woodman Inn, Hartley Street, Dewsbury, York, carrying on business together in co-partnership with T. Robinson and J. Wightman, under the style or firm of Wilson Robinson & Son, Albion Dye Works, Batley Carr, Batley, York. Dyer. Court: Dewsbury. Last day for receiving proofs August 17, 1921. Trustee: W. Durrance, Official Receiver, 12, Duke Street, Bradford.

Companies Winding Up

NOBLES DRUG STORES, LTD., 2, Wells Street, Cable Street, London, E. High Court of Justice. Date of order: July 26, 1921. Date of presentation of petition: June 2, 1921.

TAR BURNERS, LTD.—A petition for the winding up by the High Court of Justice was, on July 21, 1921, presented to the Court by W. R. Sykes, Interlocking Signal Co., Ltd., whose registered office is situate at 26, Voltaire Road, Clapham, in the county of London, engineers, creditors of the company, and the petition is directed to be heard before the Court sitting at the Royal Courts of Justice, Strand, London, on October 18, 1921. Waterhouse & Co., 1, New Court, Lincoln's Inn, London, W.C. 2, solicitors for the petitioners. Note.—Any person who intends to appear on the hearing must notify the above-named not later than six p.m. on October 17, 1921.

Companies Winding Up Voluntarily

SHERBRO PALM OIL CO., LTD.—A. C. Shutler, Balfour House, Finsbury Pavement, London, E.C.2., Liquidator.

WETCARBONISING, LTD. (in voluntary liquidation).—A general meeting of members will be held at the offices of the company, 47, Victoria Street, Westminster, London, S.W., on Wednesday, August 31, 1921. A. P. Ibbott, Liquidator.

Liquidator's Notice

BELL'S ASBESTOS EASTERN AGENCY, LTD. (in liquidation).—A general meeting will be held at 34, Fenchurch Street, London, on Wednesday, September 14, 1921, at 2.30 p.m. G. Lennox, Liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

LIVERPOOL CENTRAL OIL CO., LTD.—Reg. July 21, two mortgages, to London Joint City & Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 33, Naylor Street, Liverpool, with power, trade machinery, &c., and 43 and 45, Naylor Street, Liverpool, with power and trade machinery, &c., *£1,400. December 23, 1919.

ROSE PATENT FUEL CO., LTD., Swansea.—Reg. July 19, £100,000 debentures; general charge.

County Court Judgment

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

MEIKLEJOHN, D. D., 65, Oakley Square, London, N.W., chemical manufacturer, £13 1s. 8d. June 6.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2:—

AMALGAMATED OIL AREAS, LTD., 14, Mansion House Chambers, Queen Victoria Street, E.C.4, oil producers, &c. Nominal capital £1,000 in 1,000 ordinary shares of £1 each. Minimum subscription, 7 shares. Directors to be appointed by subscribers. Qualification of directors: 1 share. Remuneration of directors, £100 each. Chairman, £150.

LAMBERT, CHARLES W. L., LTD., 5, South Street, Finsbury Pavement, E.C.4, India-rubber merchants. Nominal capital £1,000 in 1,000 ordinary shares of £1 each. Directors: C. W. L. Lambert, S. A. L. Evans. Qualification of directors: £50. Remuneration of directors, £10 each.

LEIGHTON LABORATORIES, LTD., manufacturers of chemicals of all kinds. Nominal capital, £5,000 in 4,900 cumulative and participating preference shares of £1 each and 2,000 ordinary shares of 1s. each. Directors: C. E. Bergin (Managing Director). Qualification of directors, £100.

LUBRICINE OIL & TRADING CO., LTD. Oils, and generally to carry on the business of merchants. Nominal capital, £1,000 in 993 ordinary shares and seven founders' shares of £1 each. Directors: J. Lloyd, S. G. Sanders. Qualification of directors, £50.

NAGELS & CO. (LONDON), LTD., 76A, Chancery Lane, W.C.2. General merchants, chemists, druggists, dry-salters, &c. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: V. G. Van Waasdyk (chairman and managing director), G. C. Gagan. Qualification of directors, £1.

RUBBER PRODUCERS CORPORATION, LTD. Growers of rubber, coffee and tobacco, &c. Nominal capital, £100 in 100 shares of £1 each. Directors: To be appointed by subscribers. Qualification of directors, 1 share. Subscribers: J. E. Way, E. F. Keniston, and W. J Morgan.

WILSON, W. A., & SONS, LTD. Chemical and colour merchants. Nominal capital, £4,000 in 4,000 shares of £1 each. Directors: C. Collins, W. A. Wilson, P. Wilson, and A. C. Stevens. Qualification of directors, £500. Remuneration of directors, £100 each.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Locality of Firm or Agent.	Materials.	Ref. No.
Maasslius ...	Ores; chemicals; raw materials	94
Zurich ...	Rubber	95
Buenos Aires	Oils; paints; metals	99
Buenos Aires	Glassware; commercial chemicals	100
Budapest ...	Chemicals	—
Naples ...	Mineral Oils; naphtha and anti-corrosive paints	—
China... ...	Glassware; glass	—
Valparaiso ...	Drugs	—